

MODERN Machine Shop

July, 1939

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*in 108
distinct series*



NORMA-HOFFMANN offers the most comprehensive line of anti-friction bearings in America—108 distinct series—ball, roller and thrust types— $\frac{1}{8}$ " to 21" bore, metric and inch sizes—a PRECISION Bearing for every load, speed and duty.

Many of these types have been pioneered by NORMA-HOFFMANN engineers to meet specific requirements of advancing methods in machine design, manufacture and operation. With this wide choice of PRECISION Bearings, design possibilities are no longer restricted to the comparatively few standard types of past years.

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PRECISION BEARINGS



BALL, ROLLER and THRUST

NORMA-HOFFMANN BEARINGS CORPORATION, STAMFORD, CONN., U. S. A.

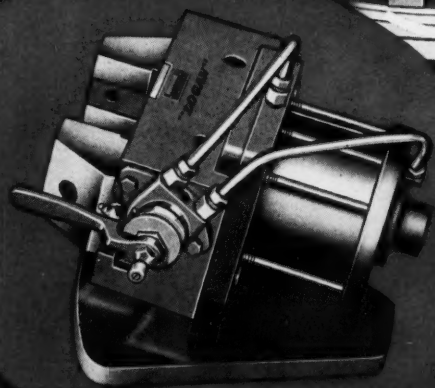
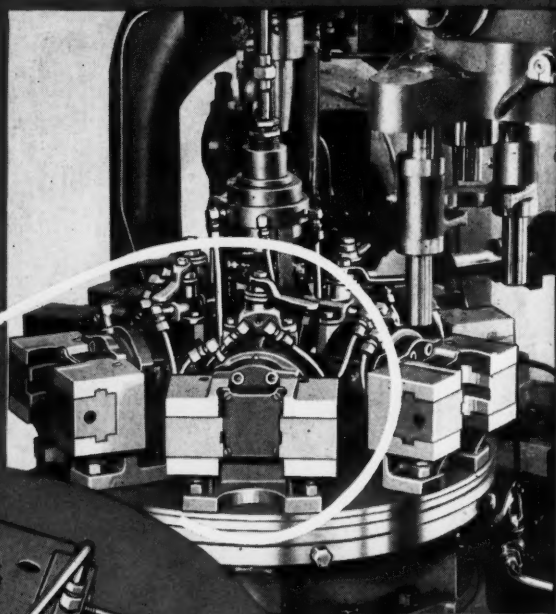
AVOID COSTLY LOADING DELAYS



Logan Work Holding Fixtures are regularly furnished for bolting to indexing tables as illustrated on the machine at the right.

The work table may be indexed so that the movement of the table and the desired machine operation are entirely automatic.

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Also furnished as an individual unit for holding irregular shapes such as valve bodies, bonnets, etc. Easily interchanged false jaws simplify the handling of various shaped pieces.



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MODERN Machine Shop

HOWARD CAMPBELL, Editor

Volume 12

JULY, 1939

Number 2

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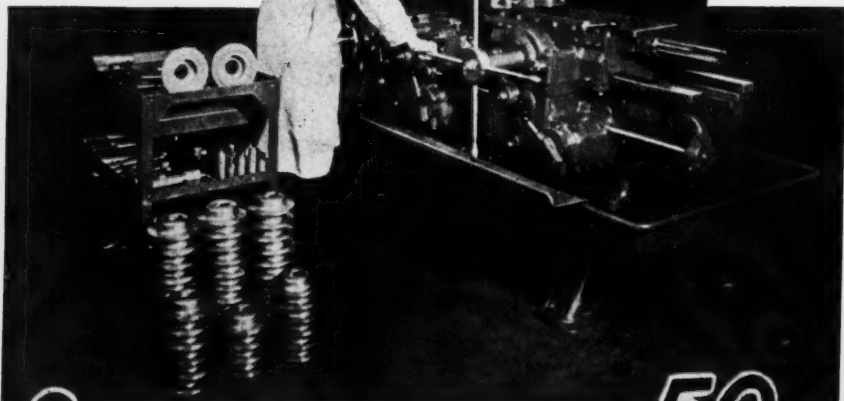
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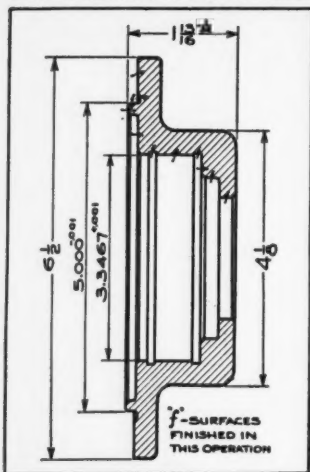
(Entered as third-class matter at Cincinnati, O., under Section 574½ P.L.&R., Act of June 5, 1934)

Circulation This Issue More Than 29,000

Machining bearing housings on No. 3 Jones & Lamson Ram Type Turret Lathe.



Production increased 50%



On a No. 3 Jones & Lamson Turret Lathe Using Carbide Tipped Tools

NUMBER 3 Jones & Lamson Universal Ram Type Turret Lathes are built with the *extra rigidity* necessary for using carbide tooling. This fact, together with speeds up to 1500 RPM, with a constant speed, 7½ HP motor, has meant a *50% increase in production* for the manufacturer of the cast iron bearing housing illustrated in the drawing.

Jones & Lamson Turret Lathes have been designed with an eye to the *future development* of carbide tools. This development will not, therefore, make Jones & Lamson Turret Lathes prematurely obsolete. This is your guarantee of sustained profits over many years.

Recommendations on tooling and machines will be made without obligation.

JONES & LAMSON MACHINE

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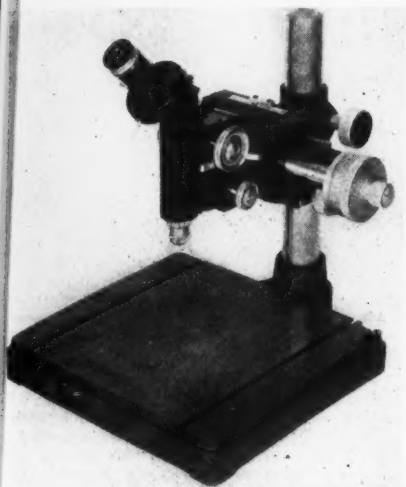
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July, 1

y mounted in the same manner as the tilting base. It is accurately graduated full 180 degrees, by degrees. Buttons on the bottom of the base fit standard 1/4-in. T-slots.

Leitz Shop Measuring Microscope

The George Scherr Co., Inc., 130 Lafayette St., New York, N. Y., has placed a new model of the Leitz Shop



Leitz Shop Measuring Microscope

Measuring Microscope on the market. The instrument has been especially developed for use in the shop, inspection department, or laboratory. The microscope is mounted on a heavy base plate, but may be removed for use as a self-contained unit in machines or fixtures.

The instrument is designed for measurements in one linear direction, has a range of 2 in. by precision micrometer screw with large dull chromium finish drum, divided directly in 1/10,000 in. For quick action, the split nut within the micrometer slide may be disengaged through a convenient handle, so that for larger distances a rapid transverse, independent of the micrometer screw, is available.

The microscope has an inclined ocu-

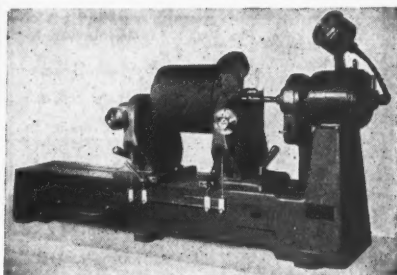
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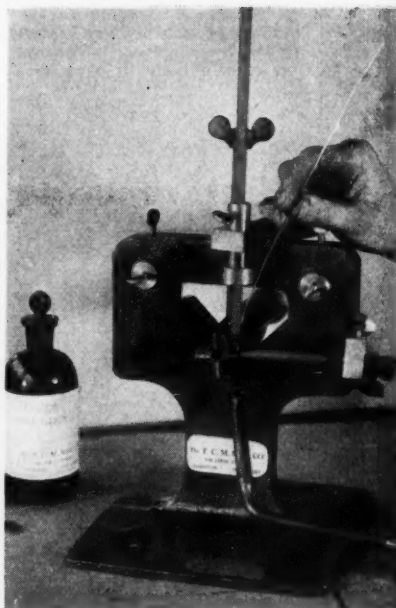
THE GLOBE TOOL & ENGR. CO.
425 DAVIS AVE. DAYTON, OHIO

lar, containing hair-line cross, with means for centering the eye-piece coaxially. The focussing is made through rack and pinion motion and a large knurled knob. Independent fine focusing by a second knob is also provided with a graduated dial whereby it is possible to obtain positive depth measurements by using an objective of higher power.

T. C. M. "All In One" Brazing Fixture

To facilitate the brazing operation on any type of carbide tool, the T. C. M. Manufacturing Co., Harrison, N. J., has introduced an "All In One" Brazing Fixture. This fixture has four adjustable arms each of which holds a $\frac{3}{8}$ -in. diameter carbon rod by means of a clamping screw. The carbon rods are easily adjusted to any position around the carbide tip to be brazed. Carbon rods are used because they are said not to braze to the brazing material and are said to withstand the brazing heat without deteriorating perceptibly.

The top arm of the fixture contains a carbon holder that is actuated downward by means of a spring. This



T. C. M. "All In One" Brazing Fixture

ROTARY TABLE



High Grade.
Low Price.

Now made in
four sizes and
six models.

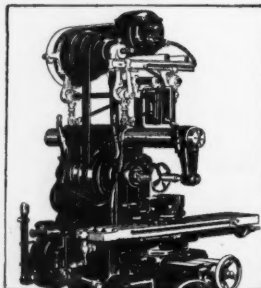
Plain rotary milling tables and combination tables with dividing plates. Ask your dealer or write us for complete catalog.

ALFRED A. TROYKE

219 E. Second St.

Cincinnati, Ohio

spring ensures the proper amount of pressure on the top of the tool tip during the brazing operation. According to the manufacturer, the ability of the "All In One" Brazing Fixture to position tips while brazing different types of tools greatly reduces the grinding time required to finish the tools. In addition to use in performing brazing operations on carbide tools, the fixture can be used for brazing and resizing multi-point tools, replacing broken tips, and brazing small parts.



Moving? Then **MOTORIZE!**

It's cheaper to motorize your present machine tools, than install and maintain overhead line shafting. That's what prominent Remco users tell us. Profit by their experiences. Find out how quickly Remco Drives are installed. How the saving on belting alone frequently pays for a complete Remco installation. Write—Remco Products Corp., State and Hay Sts., York, Pa.

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Jaws have two gripping surfaces — flat for pipe, V for flanges, fittings, and irregular surfaces. For all around use the 'IDEAL' is the logical chain wrench.

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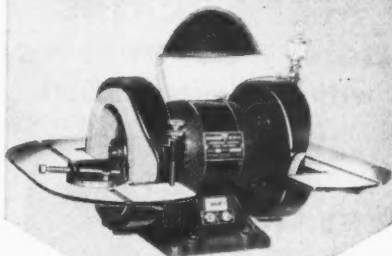
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DIVISION OF H. D. CONKEY & COMPANY
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10 DAYS
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Try this grinder for 10 days at our expense to convince yourself that it will increase your tool life and reduce tool breakage — and pay for itself in practically no time at all.

- Removes metal **FAST** when rough grinding.
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SELF-LOCKING Hollow Set Screws with the Knurled Points

**They
Pay their
Way...in
Greater
Safety**



Fig. 1641
Pat. Applied For

The knurling around the cup point surely and automatically locks these screws in place so that once turned tight, there's no chance for them to shake, jar or vibrate loose. Removal for adjustment is easily done with the usual hex bar-wrench and the screws used over and over again. Don't risk trouble. Specify the screws that won't fail you. Send for full details and samples.

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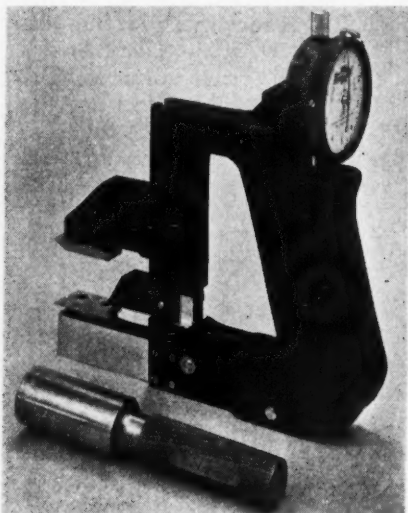
Boston
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Box 556

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St. Louis
San Francisco

Federal Adjustable Snap Gage

To promote accuracy in the gaging of small parts, the adjustable snap gage illustrated herewith has been placed on the market by the Federal Products Corp., 1144 Eddy St., Providence, R. I. While designed to act as a snap gage, the feature of this instrument is the dial indicator which provides accurate meas-



Federal Model 1330 Adjustable Snap Gage

urement and eliminates the uncertain "feel" of the operator.

The upper jaw of the gage is adjustable for size of work and is held rigidly, while the lower jaw is one end of a simple lever, the opposite end of which contacts the indicator point directly. This construction enables a simple direct transfer of the lower jaw motion to the indicator, thus ensuring a high degree of accuracy. There are no levers to operate. The work simply snaps in between the contacts against a back stop.

The jaws of the gage are equipped with carbide inserts and have a maximum capacity opening of $2\frac{1}{2}$ in. and a minimum opening of 1 in. The face of the back stop is located at angle which automatically centers the work for different diameters, and can be adjusted for diameters outside of its own capacity. The indicator is graduated in 0.0001 in., and has a range of 0.200 in. Approximate net weight, $1\frac{1}{2}$ pounds.

B & S Universal Attachment No. 734B

Illustrated herewith is a universal attachment which has been brought out by the Brown & Sharpe Mfg. Co., Dept. 43, Providence, R. I., for use on dial gages having stems $\frac{1}{8}$ in. in diameter. Designated as the No. 734B, this attachment is designed for testing internal and other surfaces which cannot be reached conveniently with the regular straight spindle of a dial gage.

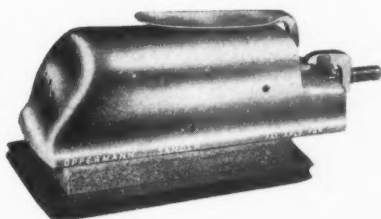


B & S Universal Attachment No. 734B

The B & S Universal Attachment No. 734B consists of a small cylinder which clamps over a dial gage stem 0.375 in. in diameter, a rod within the cylinder which contacts the point of the dial gage spindle, and a bell crank point that extends at right angles to the regular spindle.

Oppermann Sander

The Oppermann Sander illustrated herewith, designed for use in performing sanding operations of all types and especially recommended for use where



Oppermann Sander

a compound is employed for rubbing down surfaces, feather edging, and spot painting, is operated by air using a reciprocating motion. The sander, marketed by Charles T. Oppermann, 12209 Turner Ave., Detroit, Mich., makes approximately 3,000 reciprocating motions per minute, using 3 to 4 cu. ft. of air per minute depending upon the amount of pressure. Net weight, $3\frac{1}{4}$ pounds.

A little CERROMATRIX goes a long way in cutting die costs

For example: Ranco, Inc., Columbus, Ohio, using 15c worth of CERROMATRIX, secured the punches in this progressive die for blanking .078" stainless steel, at a saving of 7 hours' labor. Maybe Cerromatrix can do as well or better for you.

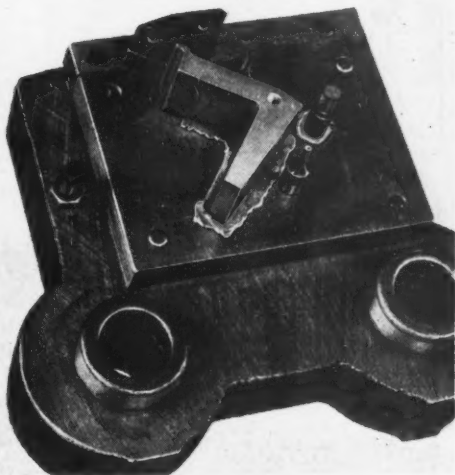
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44 WALL STREET, NEW YORK, N.Y.

BRITISH ASSOCIATES: Mining & Chemical Products Ltd., London, England

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"Easy" Electric Sander

The illustration shows the "Easy" Electric Sander, a portable all-electric reciprocating motion sanding, rubbing, and polishing machine which has been introduced by the Detroit Surfacing Machine Company, 7433 W. Davison Ave., Detroit, Mich. The sander is adaptable to a wide range of new and refinishing applications on flat, curved, and irregular surfaces, such as sanding, rubbing or polishing, from fine precision work to rough castings. It can be used on wood, metal, bakelite, granite, slate, leather, or composition surfaces, and on primer, surfacer, or sealer coats, shellac, varnish, lacquer, enamel, and other materials.

Perfect balance, light weight of only 6¼ lbs., comfortable grip, convenient switch control, and smooth reciprocating motion are said to ensure easy, one-hand operation on horizontal or vertical surfaces.

Ample power is furnished by a sturdy, ball bearing, universal motor, operating from any A.C. or D.C. electric light socket. Ball bearing construction is employed throughout and every moving part runs in grease-packed and grease-sealed precision se-


lected ball bearings. Ball bearing thrust with inner and outer races press locked in place eliminates drive shaft



"Easy" Electric Sander

shock in all directions. A large fan mounted on the motor shaft provides forced ventilation cooling. A filter installed in the motor cap removes injurious grit and dust from the air before it enters the motor.

One-third of a standard size sheet of abrasive (any kind or grit) fits the "Easy" without waste. An improved type of abrasive holder has been developed which holds the abrasive paper tightly on the sanding pad, thus eliminating loss of cutting action frequently experienced when the abrasive paper is loose on the pad. From one to several pieces of paper can be quickly and securely attached at one time.



**AMES
JUMBO
GAUGE**


With 4 inch dial graduated in 1/1000". Heavy duty. Deep throat.

**B. C. Ames
Company**

WALTHAM • MASSACHUSETTS

**VARIOUS WIDTHS
and GAUGES**

HINGES



**BUTTS AND
CONTINUOUS LENGTHS**

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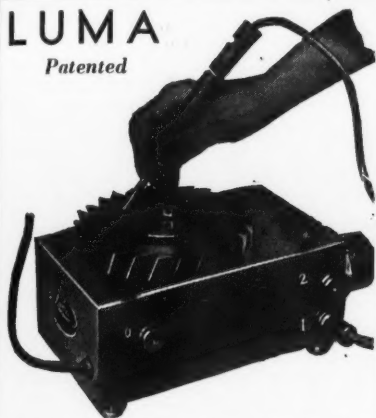
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U. S. Multiple Drill Heads are made for drilling 4 to 50 holes at once. Thus, you get more holes per minute and larger profits. Our years of specialization in this work will save you money and assure an accurate, dependable and swift job. Send your blue prints for estimates.



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PROCUNIER HIGH SPEED TAPPING ATTACHMENTS



PROCUNIER tappers are licking tough tapping jobs every day in the year.

Their sensitiveness, accuracy, rigidity and trouble-free service mean satisfaction and decreased tapping cost to you.

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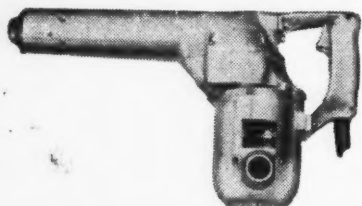
PROCUNIER SAFETY CHUCK CO.

12 SOUTH CLINTON STREET

CHICAGO, ILLINOIS

B. & D. No. 36 Portable Electric Hammer

The Black & Decker Mfg. Co., 720 Pennsylvania Ave., Towson, Md., has entirely redesigned its largest portable



B. & D. No. 36 Portable Electric Hammer

electric hammer—the No. 36—which is an entirely self-contained unit, powered by a universal motor which requires no rectifier, transformer or other additional equipment.

The operating principle is different from that of the older model, the blow action now being developed by a piston driven by a crank through a connecting rod. The recoil of the piston is ab-

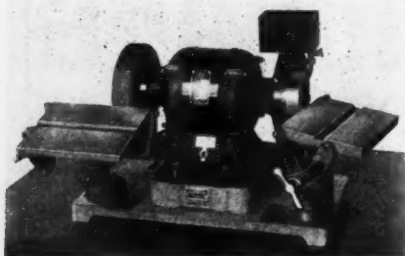
sorbed by a spring and air cushion. The universal motor, at right angles to the piston cylinder, operates the crank through a train of reducing gears. The load on the motor is no greater when the tool is working at full capacity than when idling. The hammer develops 1,950 blows per minute and has a capacity of 2 in. in concrete or brick.

Federal Internal and External Comparator

The development of an internal and external comparator with adjustable contact pressure has been announced by the Federal Products Corp., 1144 Eddy St., Providence, R. I. According to the manufacturer, this instrument accurately and rapidly checks inside diameters of small holes and outside diameters or thickness of miscellaneous types of small parts for size, out-of-roundness, taper, and bell mouth to less than 0.0001 in. The comparator has many decided improvements over the previous Federal model of this type because of its contact pressure adjustment and greater adaptability.

The "ALL-IN-ONE" Tool Grinder

SAFE • FLEXIBLE • FAST



Tool Injury Impossible, due to Low Wheel Speed and Proper Wheels.
"Protects all Tools"

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FIRST & SUSSEX STREETS
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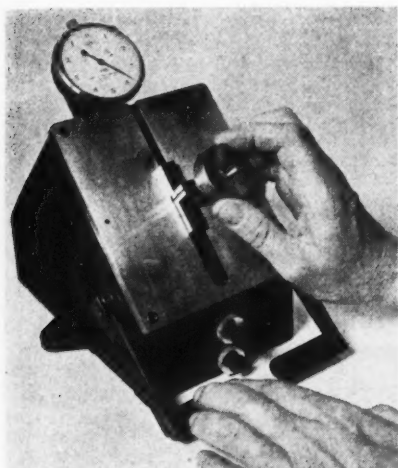
Complete with two adjustable work tables.
One Silicon Carbide Cup Wheel for roughing, 6" diameter x 1 1/2" face.
One Diamond Set Metal Cup Lap for finishing, 4" diameter x 3/8" face.
Price.....\$88.00*, F.O.B. Harrison, N. J.

For Grinding and Polishing High Speed Steel and Stellite Tools

Complete with two adjustable work tables.
One Aluminum Oxide Cup Wheel for roughing, 6" diameter x 1 1/2" face.
One 400 grit Rubber Bonded Cup Wheel for polishing, 6" diameter x 1 1/2" face.
Price.....\$80.00*, F.O.B. Harrison, N. J.
*Standard 110 volt, 60 cycle, single phase ball bearing motor.

The measuring contact point is mounted in a unique manner which the manufacturer claims not only makes the instrument more sensitive, but which also provides for easy adjustment of contact pressure to definite required amounts. The contact point can be operated by either hand, and is adjusted by means of screws provided in the front of the base.

Three basic methods of measurements



Federal Model 36B-6 Internal and External Comparator

are possible with the Federal comparator; two-adjustment contact, triangular three-point adjustment, and direct diameter three-point contact. The table plates of the instrument are interchangeable. Contact jaws are made to suit requirements and are interchangeable for different sized holes or outside measurements. Net weight, 22 pounds.

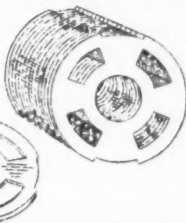
"National" Spline Taper Drive Counterbore Set

The line of spline taper drive counterbores recently developed by the National Twist Drill & Tool Company, Detroit, Mich., has been augmented by the addition of sets of counterbores designed to meet the needs of the average tool room and small shop.

The No. 2 Tool Room Set, illustrated, has two holders and interchangeable

16 PIECES AT ONCE

The first job a Hartford manufacturer cut on their new DoAll. 16 pieces at the same time, each 3/16" thick; outer diameter of plates 8". Accuracy .003 top to bottom, using disc cutting attachment. No other method will turn out such accurate work and Save 30 Hours Doing It.



Meet Today's Challenge for Greater Speed

Contour Sawing is the new Do-All process of machining. Recognized as the fastest precision method of removing metal; cuts out internal and external shapes from any metal up to 10" thick.

Does work of 3 machines. Do-All is a moderately priced, rugged, precision machine tool that replaces shaping, milling and lathe work on a large variety of jobs with enormous savings.

Used in large and small plants in 30 countries by such firms as Ford, Fisher Body, Cadillac, Baldwin Locomotive, Douglas Aircraft, U. S. Navy, International Harvester, General Electric, Westinghouse, Ace Tool & Die, Glenn L. Martin, etc.



Let a factory trained man bring a Do-All to your plant and show you what it does, what it saves on your own work.

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New
Hand-
book on
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pages of
valuable
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CONTINENTAL MACHINES, INC.

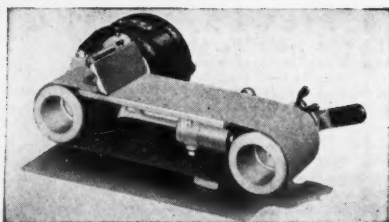
1306 S. Washington Ave., Minneapolis, Minn.

☐ Send data on the Do-All MM-7

☐ Send Free Handbook

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Address.....



•NEW An Inexpensive ABRASIVE BAND GRINDER..

"Built Like a Machine Tool"

The Hormel-M Grinder is sturdily built with a supporting leg under the grinding table to eliminate vibration and tipping due to pressure on the belt. Ball bearing throughout. Equipped with ALEMITE LUBRICATION complete with grease gun.

Write for illustrated folder on this and other styles and sizes.

HORMEL-M GRINDER

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96 WARREN ST. NEW YORK, N. Y.

ASK FOR THE GENUINE

COMET Vernier Calipers

\$6.25

with genuine leather pocket case
WHY PAY MORE?
Send for one Today!
Shop agents, dealers wanted.



Measures to .001" Outside, Inside and Depth
Measuring range 5 1/8"

Total length 8"

Scales: 1/16" with vernier 1/128"

.025" with vernier 1/1000".
Decimal equivalents on reverse side of gage.

Glass-hard jaws.

Fine workmanship.

A precision tool at a reasonable price.

COMET TOOLS, Inc.

39 Union Square, New York, N. Y.

cutters from 1/2 to 1 1/4-in. diameter inclusive. Pilots from 3/8 to 7/8-in. diameters are interchangeable within the respective ranges of cutters and holders. In addition, the set contains countersinks for 60, 82, and 90 deg. included angles. The 60 deg. cutter is for centering work, while the 82 and 90 deg. cutters are suitable for countersunk head screws.

A No. 1 Set ranging from 1/4 to 7/8-in.



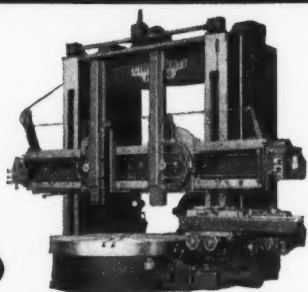
"National" No. 2 Tool Room Set

diameter, and a No. 3 Set having a range up to 3-in. diameter are also available. The sets are supplied in strong wood boxes, recessed to suit the individual tools.

Van Dorn 5/16-In. Utility Ball Bearing Drill

The Van Dorn Electrical Tool Company, 720 Joppa Rd., Towson, Md., has announced as an addition to its line a 5/16-in. Utility Ball Bearing Drill. The tool has a no-load speed of 1,100 r.p.m., which is correct for use with carbon bits and for general "utility" work. The capacity is 1 1/8 in. in steel and 5/8 in. in hardwood.

A deep-groove ball bearing on the chuck spindle with inner and outer races locked in place absorbs thrust in all directions. A splined gear mounting on

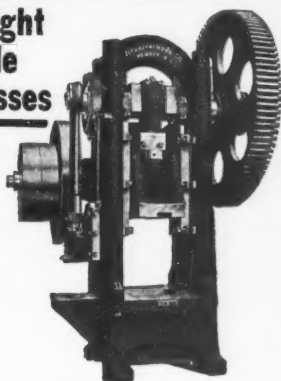


VERTICAL BORING MILLS
PLANERS, Double Housing,
Openside
CRANK PLANERS
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CINCINNATI OHIO

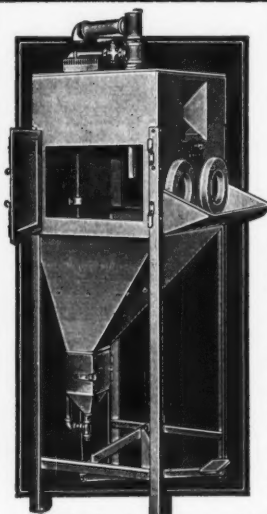
Straight Side Presses



—Outstanding in every detail for heavy blanking and forming work. All stresses are taken centrally.

Write for new catalog illustrating and describing this and other presses.

Zeh & Hahnemann Co.
 184 Vanderpool St. Newark, N. J.



REMOVE HARDENING SCALE WITH **LEIMAN BROS. Continuous Feed (PATENTED) SAND BLAST OUTFIT**

It furnishes a modern, cleanly way of cleaning moulding sand from patterns and castings. Letters and designs stenciled. Will replace the scratch brush for mat finishing and similar effects on all classes of goods—it will replace the use of disagreeable acids for this work.

Finishes may be fine, medium or coarse on all materials as desired—but, most important, it will always be uniform—no streaky, uneven results.

Any article to be plated should be sand blasted first—it will result in a more permanent plate, a quicker plate, and a saving of time in plating and a saving of current.

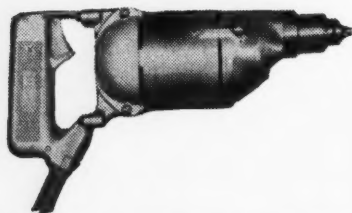
The most inexperienced person can operate it without instructions—the work cannot be spoiled.

Metal goods of every kind and description should be sand blasted to increase plating durability.

The sand blasting process makes a surface to which electro plate will adhere more securely and much more rapidly and so sand blasting saves time in plating, and improves your finish. This also applies to articles to be painted, sprayed, enameled or otherwise treated. Mat finishes of various degrees are quickly secured.

LEIMAN BROS., Inc. 4W-23 WALKER ST.
 NEW YORK CITY
MAKERS OF GOOD MACHINERY FOR 50 YEARS

the spindle is said to increase strength and reduce noise and wear. Removable commutator covers allow for easy brush



Van Dorn $\frac{7}{8}$ -In. Utility Ball Bearing Drill

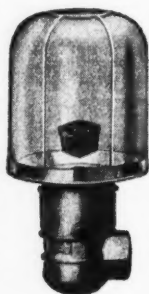
inspection. In addition, the drill has the additional chuck capacity which is often desired in connection with maintenance and repair work in industrial plants.

Trico Unbreakable Constant-Level Oiler

A line of visible automatic constant-level oilers with unbreakable reservoirs and adjustment oil level features has

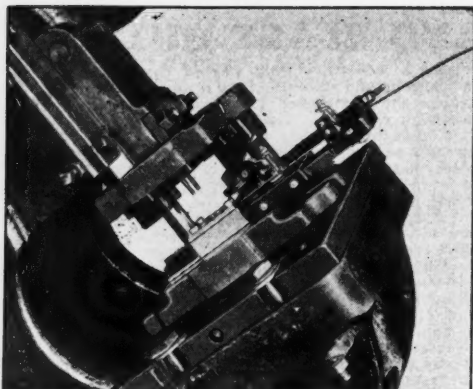
been announced by the Trico Fuse Mfg. Co., Milwaukee, Wis. The oiler illustrated automatically maintains the proper oil level in ring or ball bearings, gear and pump housings, and so on, reducing maintenance expense, bearing failures, waste of oil or grease, oil-soaked motor windings, damages to materials, fire hazards, and other dangers.

One filling of the crystal-clear unbreakable reservoir is sufficient to lubricate a bearing three months or longer, without attention. The visible oil supply tells at a glance when refilling is necessary. The reinforcing ribs of the unbreakable reservoir give added strength, streamlined appearance, and offer a good grip for handling. The reservoir is attached to the lower casting by the threaded spout. It is easily removable for convenient cleaning and refilling—a valuable feature when installed in



Trico Unbreakable Constant-Level Oiler

DICKERMAN HITCH FEED



Dickerman Hitch Feed mounted on a tilted press. Finished parts slide down into a receptacle in back of the press.

- Adaptable to any ordinary punch press without press alterations.

Built to feed from any position on any style die. Although the feed can be attached to the bolster plate of the press, it is usually affixed to the die-set as a permanent feeding mechanism for that particular die.

Quick set-up makes the Hitch Feed particularly economical for short runs.

Write for folder No. 84

H. E. DICKERMAN MFG. CO.

**284 WILBRAHAM RD.
SPRINGFIELD • MASS.**

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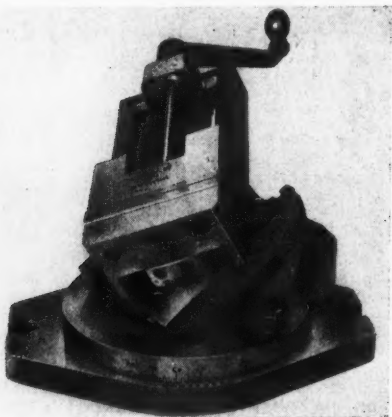
July, 1

dark or hard-to-get-at places.

The oiler is made in one, two, four and eight ounce capacities with all bottles interchangeable. Two styles are available for standard surge and high surge levels have side outlets only, and also side and bottom outlets for bottom connection or for draining purposes.

Wesson Universal Vise with Vernier Attachment

Illustrated herewith is a Wesson Universal Vise, product of the Wesson Company, 1050 Mt. Elliot Ave., Detroit,

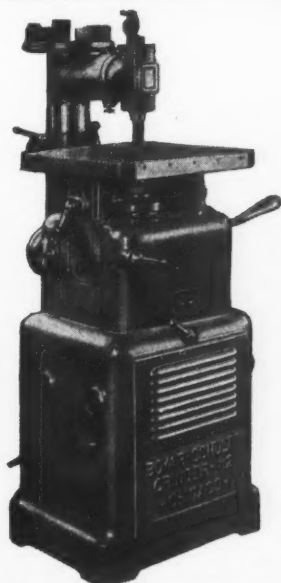


Wesson Universal Vise with Vernier Attachment

Mich., to which has been added a Vernier attachment on every angle. By the use of the Vernier attachment, an accuracy of plus or minus 15 minutes in setting angles is said to be obtained.

The vise is of cradle design and all-steel construction—features which are said to provide greater rigidity and permit rapid stock removal. The jaws are of hardened tool steel, ensuring maximum wear. Completely graduated in all planes, the work can be swung to a full 90 deg. in top and side planes and a full 360 deg. in the bottom plane.

The vise is supplied in two sizes designated as Nos. 1 and 2. The height of the No. 1 is 6 $\frac{1}{4}$ in.; maximum opening, 4 in.; jaw width, 4 in.; base width, 7 $\frac{1}{2}$ in.; and base length, 10 $\frac{1}{2}$ in. The height of the No. 2 vise is 4 $\frac{1}{2}$ in.;



The New Boyar-Schultz HEAVY DUTY

PROFILE GRINDER No. 2

It pays in real money to save time in grinding and fitting profiles, odd shapes, difficult contours and uneven surfaces. Work of this kind is now done with Boyar-Schultz Profile Grinders, easier, quicker and much better than with the old methods.

The Boyar-Schultz Heavy Duty Grinder No. 2, with the new Multi-Purpose Head is a smooth running Machine Tool that is made-to-order for Tool and Die work of larger and more difficult types. It is possible to grind heel or base punches in full view.

All controls are located to operate conveniently from the front. Large square table tilts 10°. Ball bearing mounted, 2 H. P. Motor turns either spindle at the HIGH SPEED of approximately 10,000 R.P.M. with vertical oscillations of 100 per minute. It is a rapid stock remover, even with wheels of small diameter.

Boyar-Schultz Portable Profile Grinder No. 1 is saving time in grinding, and fitting irregular shapes, contours and profiles for many Tool and Die Shops and Special Machine Shops throughout this country and abroad. It is light in weight and portable. Running at approximately 20,000 R.P.M. it gives a smoother finish in a much shorter time.

Write For Circulars Describing These Machine Tools
BOYAR-SCHULTZ CORPORATION
2120 Walnut Street • Chicago, Illinois



Clark "Stubby" Fingerlift Truck

maximum opening, 1 $\frac{3}{4}$ in.; jaw width, 3 in.; base width, 3 $\frac{1}{2}$ in.; and base length, 6 inches.

Clark "Stubby" Fingerlift Truck

A power utility fingerlift truck, to be known as the "Stubby," has been developed by Clark Tractor, Battle Creek, Mich., for general service around manufacturing plants, machine shops, warehouses, docks, and freight terminals. The truck is only 38 in. in width, and lifts loads from the bottom to a height of 60 in. According to the manufacturer, the narrow width, short wheelbase (38 in.), and steering mech-

anism, which enables the truck to pivot on one wheel and make right angle turns, provide maximum maneuverability. In addition, the low center of gravity and position of the operator atop the truck are said to provide extreme stability and enable the operator to see his pick-up clearly and spot his load accurately. The hydraulic, telescopic lift mechanism derives its power from an engine-driven pump.

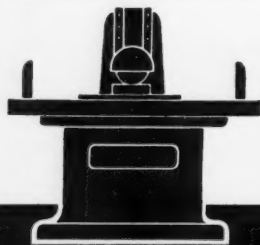
The growing practice of assembling materials and finished products in unit loads on skids or pallets has created a demand for "Stubby," which lifts loads having an underclearance of 2 in. or more and carries

them at a speed of from 1 to 7 miles per hour. The truck is also provided with rear coupling which enables it to be operated as a towing tractor. The "Stubby" is gas-powered for 24-hour continuous service and is available in several models.

Precision Master Collet

New Britain-Gridley Machine Division of The New Britain Machine Company, New Britain, Conn., is now offering to the trade a precision master collet which has been tested under all operating conditions.

The masters, made of a special collet spring steel to give the proper spring tension required in gripping and to pre-



ABRASIVE

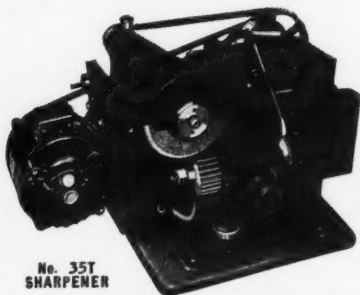
Surface Grinders

QUALITY • ACCURACY • DURABILITY • ECONOMY

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ABRASIVE MACHINE TOOL CO.

EAST PROVIDENCE, R. I.



AUTOMATICALLY SHARPENS METAL SAWS IN GANGS

Up to 5½" diameter and up to 1¼" thickness. 100 SAWS of 26 GAUGE CAN BE SHARPENED AT ONE TIME.

The saws are automatically indexed and sharpened within a variation of plus or minus .001 of exact diameter of entire lot.

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THE WARDWELL MFG. CO.

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Cleveland, O.

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DAVIS KEYSEATER

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DAVIS KEYSEATER CO.

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4 SPEEDS FOR ANY JOB

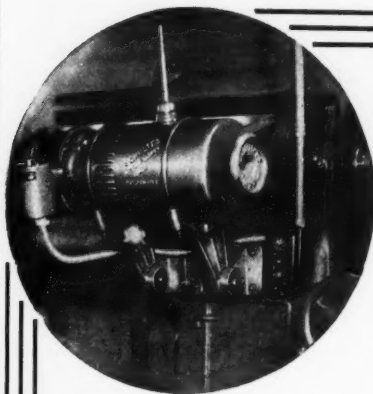
**on Milling Machines, Shapers, Lathes,
Drill Presses, Planers, Punch Presses,
Slotters, etc.**

The SCHULTES 4-Speed Drive operates each tool at the best speed for the job . . . with finger-tip control.

Schultes-equipped machines are independent units that can be located at the most advantageous points on production lines.

All moving parts enclosed . . . no belts to change by hand . . . fast . . . flexible . . . economical.

Write for further details.

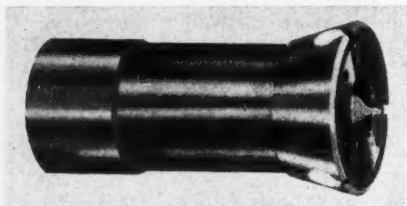


A No. 2 B & S Milling
Machine equipped with
Schultes 4 Speed Drive.

WESTLOF TOOL & DIE CO.

430 Bellevue Ave.
Detroit, Michigan

vent "setting," are accurately ground inside and outside. The extremely hard pads are ground inside and outside and locate against an undercut shoulder, assuring accuracy. Two screws located in the front end not only hold each pad in position but are also designed to



Precision Master Collet

slide the pad firmly into its seat, preventing any possibility of end-chuck and loosening. These screws are readily accessible, thus pads can be removed from the master in a machine without disturbing its adjustment in any way. Time tests have proved that the pads for a single collet can be completely changed in five minutes.

A patented round felt plug is placed in each split of the collet to prevent coolant oil and chips from washing back to the collet seat. The plugs are assisted in this task by the addition of neoprene pants which are oil resisting and which are placed around the main body of the collets. Chips which are scuffed from the bars are prevented by these pants from collecting in the collet seats and interfering with accurate location.

One set of master collets will accommodate pads from the smallest size up to the maximum capacity of the machine. The collets are now available in all sizes.

B & S No. 207 Centrifugal Motorpump

The Brown & Sharpe Mfg. Co., Providence, R. I., has added another centrifugal motorpump to its line of pumps

for supplying coolant for machine tools and light machinery where dirt or abrasives may be present in the liquid, and where a moderate volume of flow is desired at a low head. This pump is similar in general performance to the Nos. 205 and 206 Brown & Sharpe Centrifugal Motorpumps, but has a depth of submergence of $12\frac{7}{8}$ in. The addition of this pump now makes it possible to obtain these units with depths of submergence of $6\frac{1}{2}$, $9\frac{1}{2}$, and $12\frac{7}{8}$ in., providing a pump for practically every installation requirement.

At 1,725 r.p.m., the pump discharges $13\frac{3}{4}$ gal. of water per minute at a 4-ft. head, or 4 gal. of water per minute at a 10-ft. head. The addition of the No. 207 Centrifugal Motorpump with its greater depth of submergence provides a pump especially adaptable for installations in deep tanks or in places where the liquid is at a greater depth from the mounting surface.



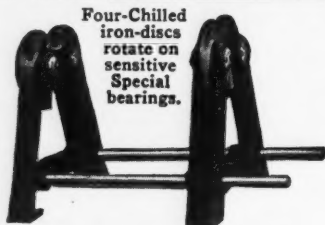
B & S No. 207 Centrifugal Motorpump

Improved Anderson Balancing Ways No Leveling Required

A simple and excellent device for balancing, straightening and truing.

They are made in the following sizes:

Swing	Greatest Distance Between Standards	Capacity in lbs.
20 in.	20 in.	1,000
40 in.	30 in.	2,000
60 in.	30 in.	2,000
72 in.	66 in.	5,000
96 in.	88 in.	10,000

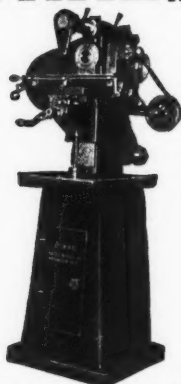


Four-Chilled iron-discs rotate on sensitive Special bearings.

Write for Full Information

Made by **Anderson Bros. Mfg. Co.**
1926 Kishwaukee St. Rockford, Ill.

BURKE Milling Machines



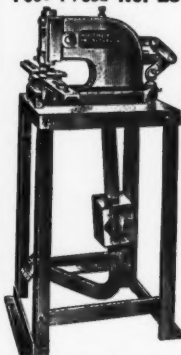
Burke motor driven milling machines, Nos. 1, 2, 3, and 4 are specially suited for handling small, difficult work on a production basis.

Write for complete information.

BURKE MACHINE TOOL CO.

287 E. 16TH ST. CONNEAUT, OHIO

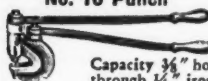
Foot Press No. 28



Angle
Iron
Shear
No. 4

Capacity
2x2 1/4"
2x2x 1/4"
Angle Iron
Weight
44 lbs.

Capacity 2" hole in 16
gauge—100 holes per min.
No. 10 Punch



Capacity 3/4" hole
through 1/4" iron.
Weight 8 1/4 lbs.

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Whitney Metal Tool Co.

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blue prints
or records.
Ample pigeon
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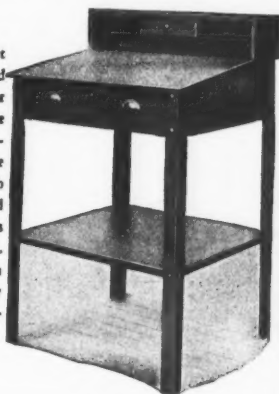


Fig. 981



Fig. 705

"HALLOWELL" STEEL TOOL STANDS

A handy stand for
tools. Drawer can
be locked. Casters
make moving easy.
Variety of styles.
Low in cost.

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PRESSED STEEL CO.**
JENKINTOWN, PENNA.

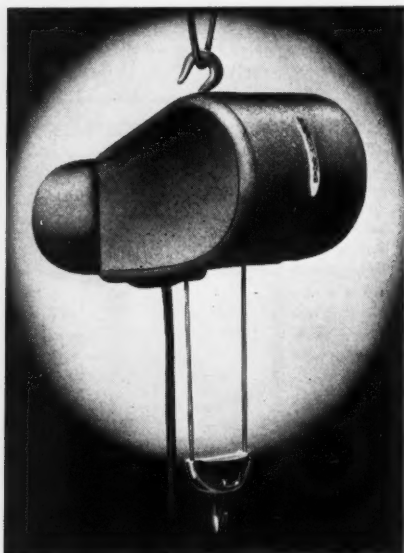
Boston
Detroit
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Box 556

Chicago
St. Louis
San Francisco

Conco Torpedo Electric Hoist

A completely enclosed cable and drum type electric hoist, featuring double drum construction, push button control, electric control, and heavy duty



Conco Torpedo Electric Hoist

construction throughout, has been placed on the market by the Conco Engineering Works, Division of H. D. Conkey & Co., Dept. C., Mendota, Ill. The hoist, to be known as the Conco Torpedo Electric Hoist, is available for either trolley, hook, or lug suspension, and in capacities of from 250 to 1,000 pounds.

The mechanism of the hoist is fully enclosed in an oil-tight, weatherproof and dustproof housing which is finished in blueslate gray baked Wrinklelac. Only two gear reductions are employed in the hoist—one worm gear and one spur gear. The spur gear is of high carbon steel, the worm of forged steel, and the worm gear of chilled phosphor bronze. All gear shafts operate on anti-friction bearings, with gears and shafts fully enclosed and operating in a bath of oil.

The hoist is equipped with cast iron drums having left and right hand machined grooves. Drums are 30 times cable diameter. A minimum factor of safety of eight is provided for cable on hoists of all capacities. Being of double drum construction, with cables on either side of the load hook, the hoist is said to center and hold its load in perfect balance while raising.

Other features of the Conco Torpedo Electric Hoist include push button control; a single pole paddle type limit switch; an electric brake of spring set disc type operated by a heavy duty solenoid connected to the control circuit; a reversible type motor that can be removed with the hoist under load, and Timken roller bearings and radial thrust ball bearings used throughout.

Speedex Wire Stripper

A hand tool which "skins" and cuts solid and stranded wire in sizes from No. 12 through No. 20, to be known as the Speedex Wire Stripper, has been placed on the market by Wood Specialty Manufacturing Co., Rockford, Ill. The stripper is said to save time and labor because it is simple to use and does a quick, smooth, clean job. To operate, it is only necessary to place the wire in the stripping jaws and press

Cullman Sprockets

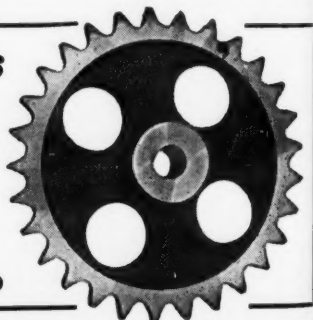
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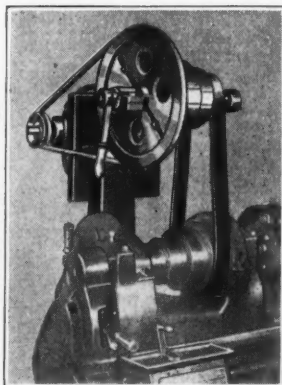
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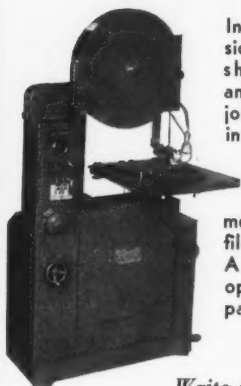
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EACH HOUR IT'S USED



Inside and outside cuts on dies, shoes, templets and endless other jobs can be done in a small fraction of the time required by former methods. Saws, files and polishes. A highly developed, large capacity machine.

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GRAND RAPIDS - MICHIGAN

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THE NEW MARQUETTE

A.C. ARC WELDER

Model 400 BT

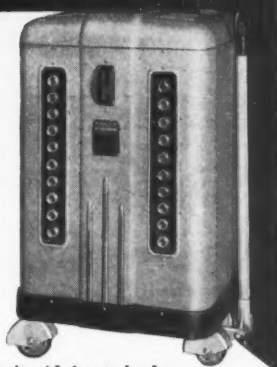
The 350 ampere Marquette 400 BT is a heavy duty, continuous production A. C. Arc Welder capable of welding 24 hours a day at maximum capacity. Its scientifically designed transformer produces a steady even arc at all 19 heat stages ranging from 30 to 350 amperes inclusive. Handles 1/16" to 5/16" rods and operates on 220 or 440 volts. It can be furnished in other voltages, if desired.

And the price? That's new, too! **ONLY \$498.** Just look at the specifications and you'll decide that the new Marquette 400 BT is the welder you can use with profit!

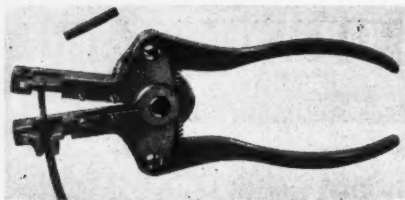
For complete details write Dept. E.

Listed by Underwriters' Laboratories, Inc.

MARQUETTE MANUFACTURING CO., Inc. MINNEAPOLIS MINNESOTA



CONTINUOUS PRODUCTION



Speedex Wire Stripper

the handles together.

The jaws and cutting blades are of hardened steel, the springs of high quality music wire, and all screws are case hardened. The tool is finished in dull nickel. The manufacturer recommends the Speedex Wire Stripper as a production tool because of its ability to strip as many as a thousand ends an hour.

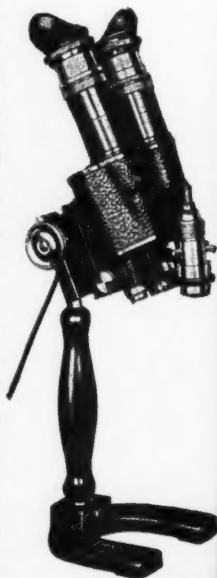
Leitz Binocular Prism Magnifier

A binocular prism magnifier for the examination of welding seams has been developed by E. Leitz, Inc., 730 Fifth Ave., New York, N. Y. The magnifier enables the welding engineer to examine

a weld thoroughly at any stage of production. Bad penetration, porosity, and tiny cracks are easily detected. The use of the binocular prism magnifier for examining welds enables the visual properties of both eyes to be utilized and eliminates eye fatigue and overstrain.

The Leitz Magnifier is equipped with an optical system which has a working distance of approximately 2 mm. (8 in.). The two prism tubes of the instrument are equipped with built-in paired objectives and interchangeable paired eyepieces, and can be rotated about the optical axis so as to vary the interpupillary distance from 56 to 74 mm. The interpupillary distance for the particular observer can be fixed by a clamping device. Sharp focusing is effected by a rack-and-pinion motion, while the left eyepiece can be focused so as to compensate for differences in sight of both eyes. The different magnifications are attained by changing the eyepieces.

The Leitz Binocular Prism Magnifier can be used with a wide range of stands. For weld testing, a special



Leitz Binocular Prism Magnifier

SET STUDS "The Roll Grip Way"



This "T" Type Titan Stud Setter drives or removes studs by gripping as little as $\frac{1}{8}$ " of unthreaded body of stud and turning slightly.

(Pat. No. 2069527)

Write for complete information.

Titan Tool Co., Fairview, Pa.

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Box 2

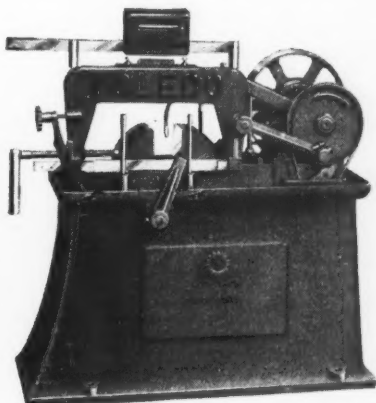
July, 1

horseshoe foot stand has been designed for the magnifier. This stand is detachable to allow the spherical end of the pillar to be conveniently placed at an angle on parts difficult of access.

L-W High Speed Power Hack Saw

A high speed power hack saw designed for economy, efficiency, and maximum rigidity has been announced

by L-W Chuck Co., 20 N. St. Clair St., Toledo, Ohio. The machine has a heavier streamlined base and heavier



L-W High Speed Power Hack Saw

box type vise jaws than previous models. The capacity is 6 x 6 in. with a 14-in. blade.

GRAY TURRET HEAD METAL CUTTER OR NIBBLER



Cuts all metals any shape—30 gauge up to 1".

GRAY, Originator of First Practical Metal Cutter or Nibbler. GRAY Cutters Still Lead.

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Fixtures... 7 chapters—36 pages—17 illustrations

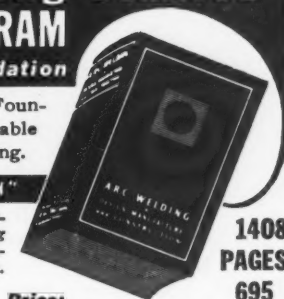
Section VII—Commercial Welding... Automotive Repair

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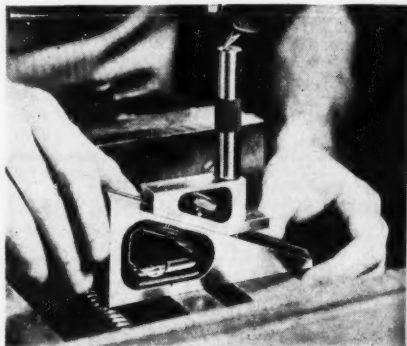
The sliding bearing is dovetailed to fit the arm and is adjustable in all directions. Automatic relief of the saw blade on the non-cutting stroke is provided. Another feature of the saw is an automatic trip which stops the machine on completion of the cut. The coolant pump is mounted inside the base.

Starrett Precision Gage No. 599

To meet the need for a planer and shaper gage that can be used with even greater accuracy than a previous model made by The L. S. Starrett Co., Athol, Mass., this company has brought out the Starrett Precision Gage No. 599. In the new model, alignment and parallelism of ends, sides, and work contacts are held to closer limits. Lateral play of the slide and base is eliminated through the use of angular ways. When the gage is set to a micrometer, surface gage or caliper, and a planer or shaper tool brought into contact with it, the cut of the tool is said to be absolutely accurate.

The range of the Starrett Gage No. 599, including the 3-in. extension used on longer measurements, is $\frac{1}{4}$ to 9 in.

A level built into the base of the gage is said to be very useful when setting up work on the planer table. Both the base and the slide are hardened steel forgings with all working surfaces smoothly ground. The base of the gage is $\frac{3}{4}$ in. wide and $5\frac{1}{4}$ in. long; the ex-

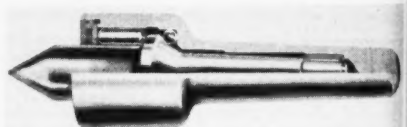


Starrett Precision Gage No. 599

tension is $\frac{5}{8}$ in. in diameter and 3 in. long. The total weight of the gage is approximately 25 ounces.

Economical Live Ball and Roller Bearing Center

An economical live ball and roller bearing center for lathes, hand screw machines, hand mills, and grinders, has



Economical Live Ball and Roller Bearing Center

been placed on the market by the Motor Tool Mfg. Co., 12281 Turner Ave., Detroit, Mich. The center is constructed with a head of small diameter and short length, and has a large diameter spindle. The short length of the head makes possible a very slight overhang, a feature which is most desirable.

The center is equipped with a roller bearing in the front end of the head for radial load, a three-point bearing

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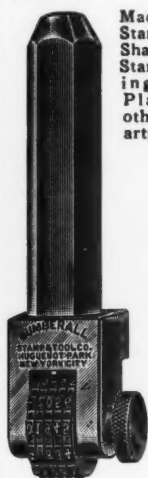
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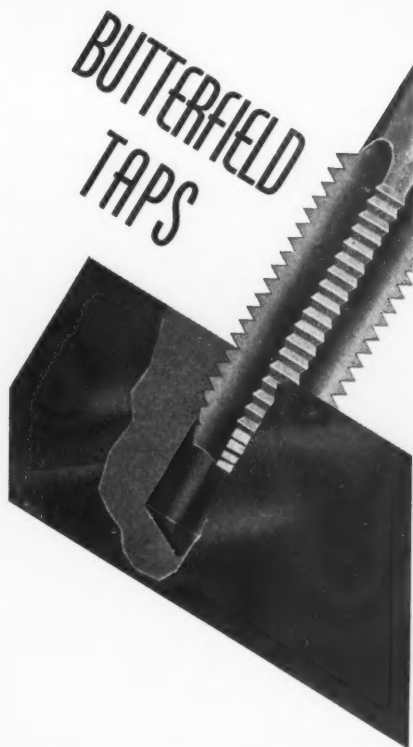
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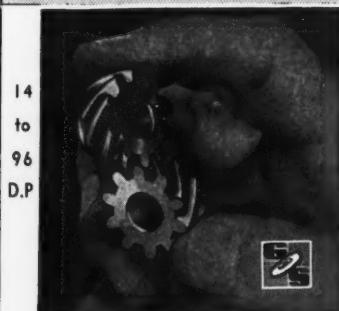
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contact with balls for thrust load, and a needle bearing in the end of the taper shank for alignment and assurance of its free running. A perfected type oil seal protects all bearings from foreign matter.

"Solidend" Multirol Bearing

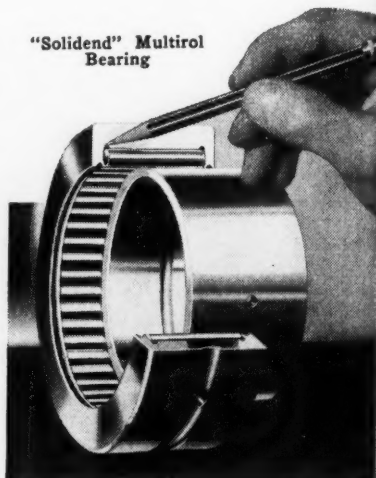
McGill Manufacturing Company, 1500 N. Lafayette St., Valparaiso, Ind., has announced a design of full type needle roller bearing, to be known as the "Solidend" Multirol, which is said to ensure an increase in load-carrying capacity of as much as 12 per cent over any previous design.

"Solidend" is intended to be descriptive of the new outer race construction by which rollers are held integral without the use of end washers and retaining end rings. Roller retaining shoulders are built integral with the outer race so that the possibility of accidentally bending or breaking the conventional end washers, resulting in disassembling the unit, is eliminated.

Extra load-carrying capacity is provided by using full length rounded end rollers instead of the usual trunnion or conical ends, thereby increasing effective

race and roller contact. A variety of size combinations that can be used with or without the separable inner

"Solidend" Multirol Bearing



rates in shaft sizes up to 5 in. facilitates the application of the bearings. Special and larger sizes can be worked out with the help of the McGill engineering department.

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Good Gears Only

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Precision work on special machines, parts, jigs, tools, etc.



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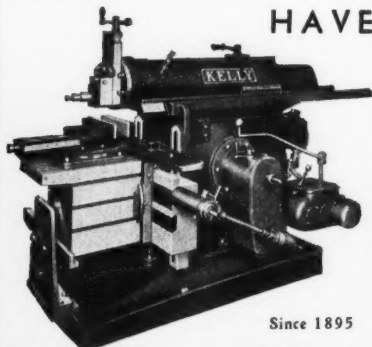
306 HUDSON ST.

NEW YORK

B & D No. 34 Portable Electric Hammer

The Black & Decker Manufacturing Company, 720 Pennsylvania Ave., Towson, Md., announces the redesigning of the No. 34 Portable Electric Hammer to increase the motor power and the efficiency in order to provide faster drilling ability and to increase the life of the moving parts. This tool is a completely self-contained unit which is powered by a universal motor and requires no transformer, rectifier or other extra equipment. No change has been made in the operating principle of the tool, the action being developed by an oscillating weight and spring assembly, the weight driven indirectly by a crank. The motor is mounted at right angles to the barrel and operates through a train of reducing gears. The action is characterized by a definite "follow-through" stroke, producing a high ratio of efficiency.

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Since 1895

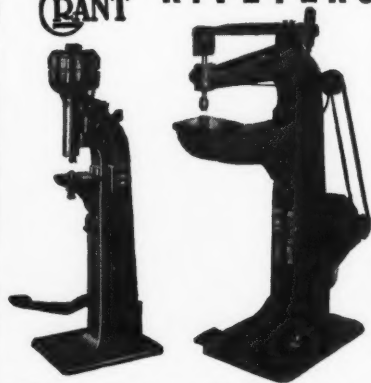
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General Engineering & Mfg. Co.
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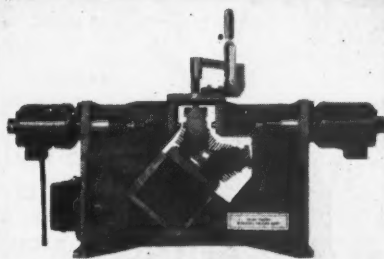


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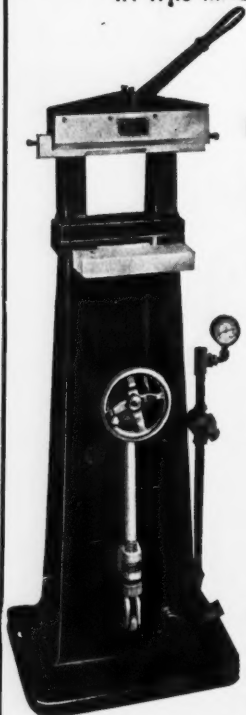
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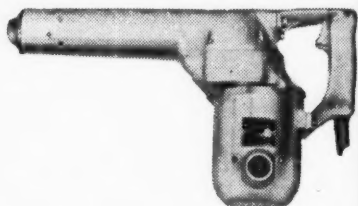
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The hammer has a weight of only 12 lbs., develops 2,300 blows per minute and has a capacity in concrete or brick of 1½ in. It is said to be especially useful for drilling and channeling in concrete, stone or brick; removing form marks from concrete surfaces; caulking joints and seams in tanks, pipe lines

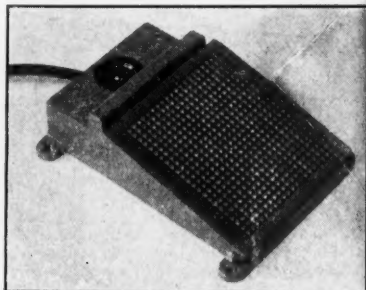


B & D No. 34 Portable Electric Hammer

and so on; removing scale in boilers and tanks; tamping molds and concrete forms; vibrating concrete forms for smooth finish, and so on.

"The 3rd Hand" Foot Control Switch

A foot control switch for unit powered tools has been placed on the market by The Walton Company, 98 Albany St., Hartford, Conn. This control



"The 3rd Hand" Foot Control Switch

switch, designated as "The 3rd Hand," requires little effort to operate, and leaves both hands free to handle work at the drill press, saw table, lathe, grinder, and so on. The foot plate is large enough to be easily located without taking the eyes from the work, and the angle of the operator's foot

is natural and untiring. The switch is D.P.S.T. rated 12 amps., at 125 volts and 6 amps. at 250 volts.

The power tool motor runs as long as the foot is on the control switch. To inspect work, or when through with an operation, the removal of the foot automatically stops the motor.

"The 3rd Hand" Foot Control Switch is supplied with receptacle, and eight feet of heavy-duty cord and plug. If desired, one or two holes for BX or conduit will be furnished in place of heavy-duty cord and receptacle.

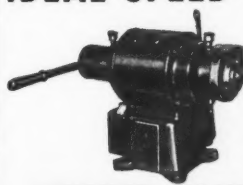
"Footburt" No. 1½ Automatic Single Spindle Screw Machine

A No. 1½ Automatic Single Spindle Screw Machine having a hydraulic feed with convenient controls for rapid change-over is now being built by The Foote-Burt Company, Cleveland, Ohio. The machine has a normal chuck capacity of 1½ in. but, by using a solid chuck and shell, it will take 1¾ in. Due to the wide range of speeds, the machine is said to be efficient down to ½ in. and will machine pieces up to 14 in. long. The machine is of com-

pact design, all parts being housed in the machine frame. According to the manufacturer, all adjustments can be made quickly, making the machine efficient on short runs and, because of its fast indexing time, creating efficiency on long runs as well.

The spindle is of heavy duty construction with precision ball and roller bearings and is equipped with a chucking device consisting of a roller arrangement working under spring compression, a feature which is said to make the spindle more positive. Power is supplied to the spindle through a train of

IDEAL SPEED LATHES

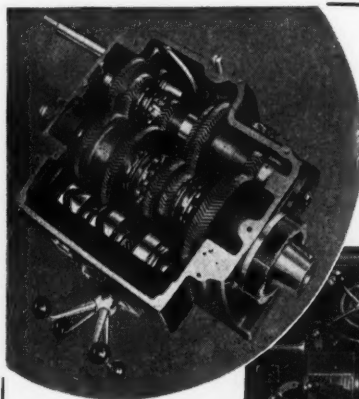


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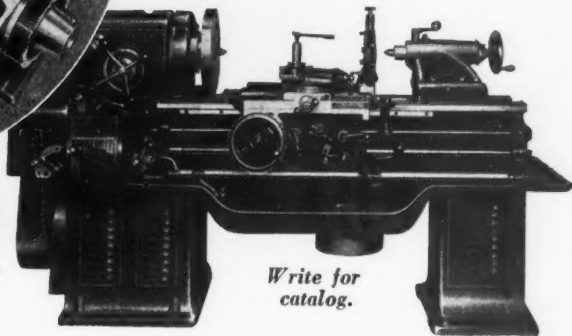
SCHAUER MACHINE CO.

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All-Herringbone Transmission Only in Sidney Lathes

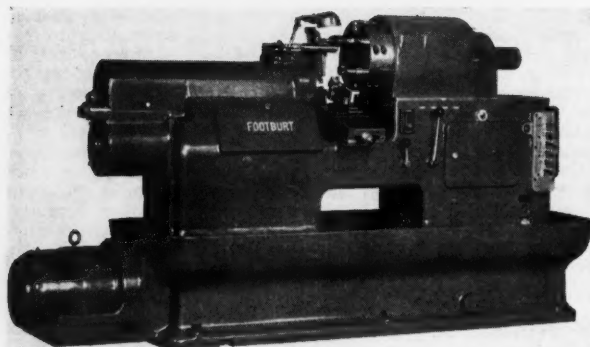
An all-herringbone transmission, composed of 19 continuous-tooth gears, completely eliminates all gear tooth or tool marks from the work. Controlled by Monotrol (1 dial) or Tritol (3 levers). Sizes 14" to 24".



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MACHINE TOOL CO.**

210 Highland Ave.
Sidney, Ohio

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catalog.*



"Footburt" No. 1 1/2 Automatic Single Spindle Screw Machine

change gears. Automatic speed changes, including two forward and two reverse speeds, are obtained by means of a disc plate having adjustable trip dogs which control the operation of hydraulic cylinders for operating multiple disc clutches providing changes from high to low speed, or to reverse, at any turret hole, or at any point in the feed. The spindle can be reversed at low speed and immediately tripped

to high reverse speed, permitting the use of a simple tap holder.

The turret of the machine is provided with six holes and is of rugged construction to withstand heavy feeds. The turret is indexed by Geneva motion, the efficient operation of which is shown by the fact that a complete cycle is made in eight seconds. The feed is operated by means of a drum-type hydraulically-driven cam having a

solid path. A control panel having six micrometer type knobs for controlling hydraulic valves, one for each hole of the turret, is furnished. The turret is arranged so that oil feed drills and reamers may be used, and the coolant to these is automatically controlled so that the coolant starts to flow as the tool enters the work and is shut off as the tool leaves the work.

The cross slides are of heavy con-

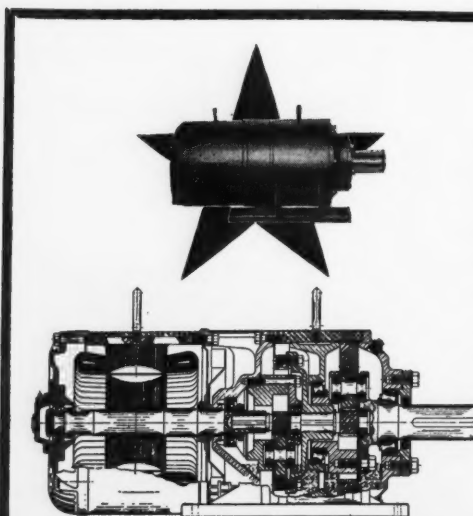
struction and machine means system

The driven mount. This shaft the drive pump motor machine

Stock by a feed of the difference by sim

Extra speed cut-off ming be fur

Spec chuck in.; m ment, minim mum, 6; dia height of spi slides, 1,000 r motor 1,800 inches.



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A.C. - GEAR MOTORS - D.C.

For pumps, mixers, dyeing equipment, washers, cranes, elevators, etc.

● This type STAR Gear-Motor is built in sizes from 1/2 to 75 h.p.* With integral 1800 r.p.m. A.C. or D.C. motors, this type will provide output speeds between 132 and 56.5 r.p.m.*

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DAY MINN

July, 19

struction with ample bearing surfaces and are fed by a cam disc. The machine is lubricated throughout by means of a force feed pump circulating system.

The "Footburt" No. 1½ Machine is driven by means of an enclosed motor mounted at the rear of the machine. This motor drives a master horizontal shaft from which vee belts connect to the drive of the machine. The horizontal shaft also drives a hydraulic pump which in turn drives a hydraulic motor so that the drive and feed of the machine are from the one motor drive.

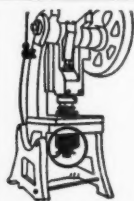
Stock feed and chucking are operated by a cam drum that advances the stock feed tube and controls the clamping of the collet jaws. The adjustment for different lengths of stock is obtained by simply turning one screw.

Extra attachments including a high speed drilling attachment, independent cut-off attachment, and double camming for stock feed and chucking can be furnished with the machine.

Specifications of the machine are: chuck capacity, 1½ in.; stock feed, 14 in.; milling length, 6 ft.; turret adjustment, 4 in.; turret to face of chuck, minimum, 5½ in.; turret forward, maximum, 9½ in.; number of turret holes, 6; diameter of turret holes, 1½ in.; height from top of cross slide to center of spindle, 2½ in.; number of cross slides, 2; spindle speeds, steel, 30 to 1,000 r.p.m., brass, 60 to 2,000 r.p.m.; motor drive through vee belts, 7½ h.p., 1,800 r.p.m.; floor space, 32½ x 105 inches.

Alco Button-Type Die Holder

A button-type die holder with adjustable concentric alignment feature designed to eliminate setting up difficulties and save on set-up time has been



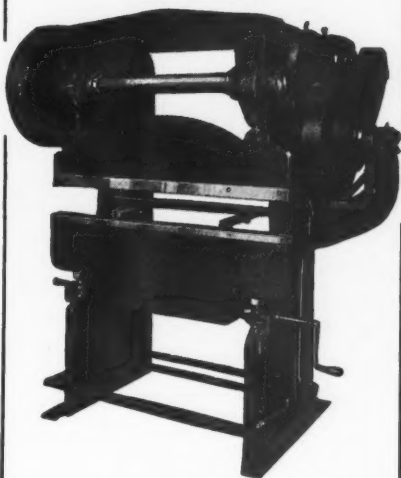
Universal Die Cushions for deep drawing, forming die, pressure pad control, and blanking die stripper actions.

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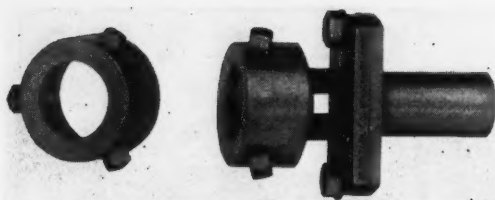
Here's a profitable, economical brake ideally adapted for rapidly forming metal sections such as in stoves, refrigerators, soda fountains, steel cabinets, metal furniture, steel boxes, and a great variety of sheet metal specialties. Its variable speed drive operates from 17 to 50 strokes per minute. The No. 253 CHICAGO STEEL PRESS is accurate, compact, and ruggedly constructed of highest quality materials.

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Alco Button-Type Die Holder

developed by Alco Tool Company, Bridgeport, Conn. To use, the operator simply tightens the die in the die cap, adjusts the floating feature, and tightens the two studs. The simplicity of setting up makes the use of button dies advantageous and economical.

Three set screws are all that are used, and correct alignment for permanent use is quickly made. The floating feature permits the die to run over the work before the flange is tightened, assuring accurate concentric alignment. The design provides for a greater amount of chip room and also for better lubrication. The floating feature is said to eliminate cutting of taper threads.

All Alco die holders will take dies of several outside diameters.

No Mushrooming ▶
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 STAMPS, Inc.**

149 Joseph Campau, Detroit

Lyon Self-Heating Showerway

A self-contained unit which is said to provide the means for 100 per cent sanitary hand washing, to be known as "Showerway," has been placed on the market by Lyon Metal Products, Incorporated, 1306 River St., Aurora, Ill. The claim of 100 per cent sanitation is based on the fact that

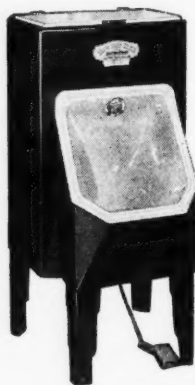
the warm, showering water is released by a foot pedal and the liquid soap comes out all around a soap plunger, cleaning it each time it is used.

The "Showerway" is self-contained in that the water is held in the unit itself, in a six-gallon stainless steel tank. Stepping on a foot pedal releases the water through a showerhead by gravity. There is no force, consequently a thorough handwashing can be had with from six to eight ounces of water.

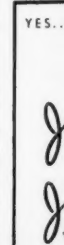
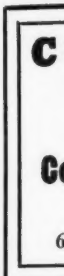
Another unique feature is the fact that Showerway provides its own heat. The water is heated right inside the unit. In the case of electrically heated models, water is also thermostatically controlled so that it is held at an even temperature.

There are three models of Showerway available. One of the models is for use where no running water or electricity is available, another where electricity is available but no running water and the third, automatic, model is for use where both running water and electricity are available. The automatic model can be connected with the regular city water supply and drain.

The Showerway unit is about the size of a small refrigerator, fabricated of metal throughout and the body is finished in dark green enamel. The bowl is finished in light green porcelain enamel.



Lyon Showerway



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Linley High Speed Vertical Milling Machine and Jig Borer

The Linley High Speed Vertical Milling Machine and Jig Borer with micrometer screw feed quill now being built by Linley Brothers Company, 15 Montauk St., Bridgeport, Conn., is said to be especially adapted for such small work as dies, jigs, fixtures, model work, metal pattern work, plastic molds, and so on. The machine is of simple design but provision is made for a variety of spindle speeds so that the proper speed will be available for any size of end mill.

The spindle is of chrome nickel steel, double heat treated, ground all over, and lapped on the bearing surfaces. The spindle runs in preloaded ultra-precision ball bearings which are grease-sealed and need no adjustment. The spindle pulley runs on separate ball bearings; thus there is no strain on the spindle. To eliminate the possibility of hammering to remove taper shank tools, the spindle nose is machined to take collets up to and including $\frac{1}{2}$ -in. capacity and a special collet is furnished to take a No. 5 B & S or No. 1 Morse taper shank.

The spindle nose is hardened with the thread and bore ground and lapped for extreme accuracy. All rotating parts are balanced for smooth operation.

A feed of unusual smoothness is provided through a 10 pitch screw running parallel to and solidly attached to the quill flange at its upper end. A bronze nut fitting the screw and with spiral teeth on the outside is in mesh with a hardened and ground spiral gear which is keyed to a horizontal shaft on the opposite end of which is the handwheel. The spiral gears can be adjusted diametrically and endwise to remove backlash.

The handwheel is equipped with a dial of $2\frac{1}{2}$ -in. diameter graduated in hundred-thousandths inch. A depth stop gage, also graduated, is located on the front of the quill. With graduations of 10 lines to the inch and one turn of the handwheel equalling 0.100 in., work can be accurately machined to predetermined depths. Eight spindle speeds are available and a reversing switch is provided to operate the motor in either direction for right or left hand mills.

The table surfaces are carefully hand-scraped and securely gibbed for rigidity. The screws are of chrome nickel

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SHELDON Back Geared Screw Cutting PRECISION LATHES



See the SHELDON before you buy any 10", 11" or 12" lathe

Sheldon today offers the most lathe per dollar invested—in weight, features, workmanship and quality. Beds of Sheldon Lathes are full weight semi-steel with heavy cross girts and hand scraped ways—2 V-Ways and 2-Flat Ways. Spindles are large,

heat treated steel, ground all over and are hand fitted into heavy bronze bearings. Handles, dials and parts are of standard industrial size and type. Each SHELDON Lathe has its full complement of optional attachments and accessories and is available in a number of different drives.

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1020 BW with Overhead Motor Drive Attachment (less motor). 10" swing, 20" between centers, $\frac{3}{4}$ " Collet Capacity. Worm Feed Apron with Power Cross Feed. Semi-Quick Change Gear Box and Thread Chasing Dial.

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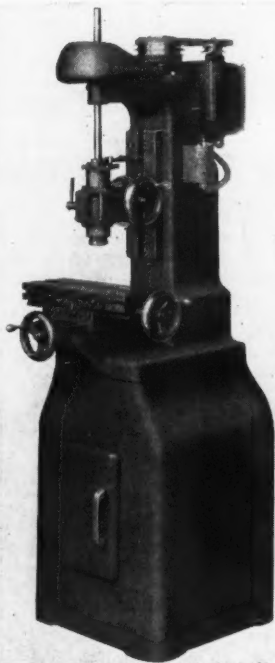
SHELDON MACHINE CO., INC.

1626 N. KILBOURN AVE.
CHICAGO, U. S. A.

Spee
Spee
1834 S
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steel with 10 threads per inch running in burnished bronze nuts. The dials are $2\frac{1}{2}$ -in. diameter with 100 thousandth-inch markings. A standard $\frac{1}{2}$ -in. T-slot extends the full length of the table.

The table is $5\frac{1}{2} \times 14\frac{1}{2}$ in. Longitudinal travel of table, 10 in.; crosswise travel of table, 5 in. Table top to

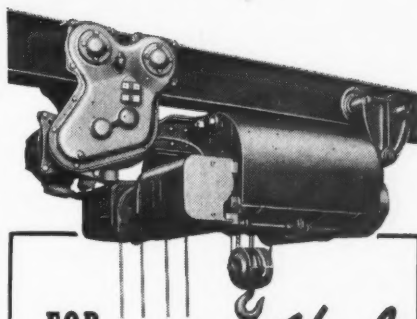


Linley High Speed Vertical Milling Machine and Jig Borer

spindle end, maximum, 9 in. Movement of sliding head, 8 in. Spindle travel, 3 in. Spindle center to column ways, $5\frac{1}{4}$ in. Spindle speeds, 275, 430, 550, 860, 1,250, 2,125, 2,500, and 4,250 r.p.m. Floor space required, $18\frac{1}{2} \times 20$ in. Shipping weight, 800 lbs. The machine can be provided for bench use if desired.

Speedway No. 89 Portable Drill

Speedway Manufacturing Company, 1834 S. 52nd Ave., Cicero, Ill., announces a standard $\frac{1}{2}$ -in. industrial drill of a



FOR Long Fast Hauls use a MOTOR TROLLEY TYPE A-E-CO LO-HED HOIST

When—1. The haul is long, regardless of weight of load. 2. The operation is frequently repeated. 3. The path under hoist is obstructed. 4. Speed is an important factor—

The motor trolley type A-E-CO Lo-Hed Hoist should be used—It is driven by a separate motor and controlled from the floor.

For high-lights of this hoist see A-E-CO POINTS (below). For full details of Lo-Hed hoists, send for our new catalog today.

POINTS

- Lo-Heds range from $\frac{1}{4}$ to 12 ton capacities. (Above type available from $\frac{1}{2}$ to 6 tons.)
- Operates on Standard I-beam or track of any make.
- Low headroom—stacks materials higher than any other hoist.
- Safe, fool-proof.
- Compact, strong, simply constructed.
- Protected against dust, moisture, fumes.
- Heavy duty, ball-bearing HOIST SERVICE motors.
- Automatic lowering brake.
- Ball or roller bearings at vital points.
- Improved plow-steel cable.
- 100% positive automatic stop.
- Efficient spur-gear drive . . . and

LO-HED COSTS LESS PER LIFT

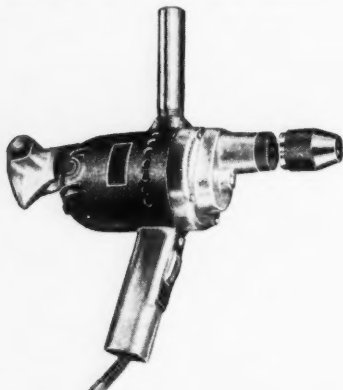
AMERICAN ENGINEERING COMPANY

A-E-CO
Lo-Hed
HOISTS

2451 ARAMINGO AVENUE, PHILADELPHIA, PA.
OTHER A-E-CO PRODUCTS: TAYLOR STOCKERS
MARINE DECK AUXILIARIES • HELIX-KAW FLUID POWER

design which is said to depart radically from previous Speedway drills.

The mechanism of the No. 89 Drill is enclosed in a modern, streamlined



Speedway No. 89 Portable Drill

die cast case finished with rich blue crackle and white enamel. The tool weighs but 9½ lbs. The handle is a combination breast and end design to be

gripped crossways instead of in pistol fashion which, it is claimed, greatly increases the adaptability of the grip and drilling accuracy by allowing power to be applied directly behind and in a direct line with the drill point. Other mechanical improvements include (1) a special wound, high torque motor operated at 500 r.p.m. and which will not stall under a 500-lb. thrust while drilling at capacity; (2) greatly improved air cooling which assures long motor life; (3) self-aligning oilless bearings; (4) removable side handle for close quarter drilling, and (5) sliding thumb switch.

Fafnir All-Rubber Cartridges

The same silence of operation featured in the Fafnir All-Rubber Pillow Block is now available in both flange and cylindrical cartridge units made by The Fafnir Bearing Company, New Britain, Conn. The completely resilient housing insulates the bearing, absorbs noise and vibration, and automatically compensates for small errors of align-

QUICK and ACCURATE
No. 35 FLYNN
 MICROMETER
 OFFSET
 BORING HEAD
 HAS RIGIDITY
 PLUS A
 Large Range
 2" OFFSET
 ¾" bar or tool capacity.
 Bores ½" to 12" dia. holes.
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 437 Bates St. • Detroit, Mich.

Accurate Hole Transfer Made Easy With NIELSEN TRANSFER SCREWS

Simply insert in holes, invert, strike sharply and you have centers and drill circles perfectly located. Reduce time and eliminate spoilage of other methods. • 7 Sizes U. S. S.—Inexpensive—Last for years.

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NIELSEN TOOL & DIE COMPANY
 1863 Gardner Ave. Berkley, Mich.



Fafnir Rubber Flange Cartridge

ment and longitudinal shaft expansion. Developed primarily for the heating, ventilating, and air-conditioning fields, the units should prove valuable wherever these advantages are desired.

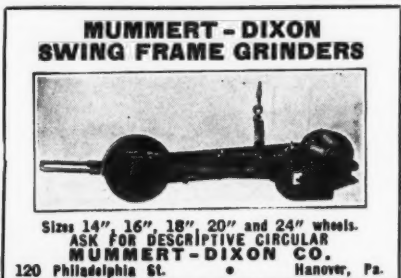
The Rubber Flange Cartridge (illustrated) is available for all standard shaft diameters from ¾ to 1½ in. The Rubber Cylindrical Cartridge is offered

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SIZES 14", 16", 18", 20" and 24" wheels.
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largely used for special taps, single
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for the same shaft sizes. Each of the units embodies a Fafnir Wide Inner Ring Ball Bearing with exclusive self-locking collar, bored to inch rather than metric dimensions, for slip fit on stock shafting, and can easily be installed without machining, locknuts, sleeves or adapters.

Baldor No. 714 DeLuxe Grinder

The Baldor Electric Company, 4357 Duncan Ave., St. Louis, Mo., is now



SAVE YOUR FLOORS
RE-WHEEL YOUR TRUCKS WITH END-WOOD WHEELS
Easy Rolling
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Sizes for all trucks.
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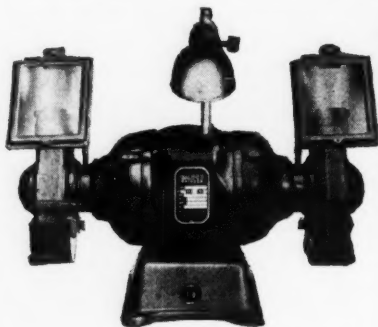


Two Sizes

No. 1 cuts up to No. 11 gauge strip or sheet.
No. 2 cuts up to 1/4" steel plate.
Special Blades for shearing stainless steel.
BREMIL MFG. CO.
1725 PITTSBURGH AVE. ERIE, PA.

marketing the Baldor No. 714 DeLuxe Grinder shown in the illustration. The main feature of the grinder is the provision of a shatter-proof eye shield over each wheel and a machine tool light which may be swung over either wheel.

The grinder is powered by a 1/2 h.p.



Baldor No. 714 DeLuxe Grinder


3,400 r.p.m., 60 cycle, single or three-phase motor. The Aloxite wheels are of 7-in. diameter and 1-in. face. The grinder is equipped with closed guards.

Portable Unit for Sterling Speed-Bloc Sanders

Users of Sterling Speed-Bloc Sanders will be interested to learn that Sterling Products Company, 2457 Woodward Ave., Detroit, Mich., has recently announced the portable unit illustrated herewith. The unit includes the tray mounted on castors and the uprights

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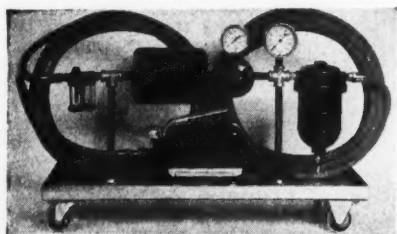


without
a drink—

ARGUTO OILLESS BEARING CO.

Wayne Junction, Philadelphia, Pa.

and fittings which, together with the sander, provide a convenient, portable outfit for use any place in the shop.



Portable Unit for Sterling Speed-Bloc Sanders

Space is provided in the tray for small tools, wiping cloths, and abrasive paper to save time on the part of the operator. The arrangement of the unit brings the air controls within easy reach regardless of where the work is being done in the shop.

The manufacturer is also marketing a unit which can be mounted on the wall or ceiling in a fixed position, where such an arrangement is more desirable.

Bechler Series BE Universal High Precision Automatic Screw Machine

The line of Bechler Universal High Precision Automatic Screw Machines marketed by Triplex Machine Tool Corp., 131 Barclay St., New York, N. Y., has been augmented by the addition of the BE Series, designed to handle larger work than can be handled in the Models A and AE machines. The new series is made in six models, to take bar stock from $\frac{1}{2}$ -in. diameter to $\frac{3}{4}$ -in. diameter, depending on the model.

The Bechler Universal Automatic Screw Machine is designed to deliver extreme accuracy and fine finish at high speeds. Double micrometer adjustment is provided to all tool holders permitting accuracy said to be within 0.0005 in. and less, eliminating waste of time and material in setting up. A patented drive permits from 88 to 100 production speeds to the camshaft, permitting a wide variety of work to be handled at speeds necessary for maximum production.

In the Bechler machine none of the

BERGRAM Utility Grinders

"Grinders With Many Uses"

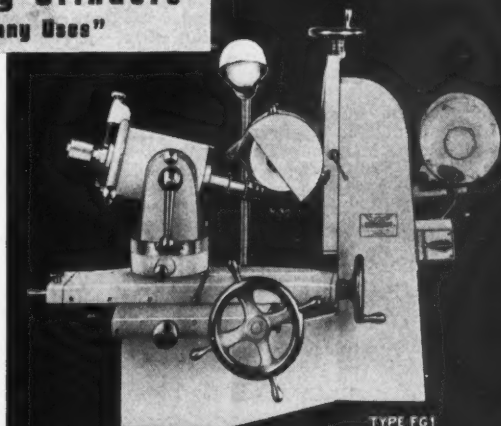
Accurately Grind:

1. End Mills
2. Small Cutters
3. Straight or Tapered Reamers
4. Tap—lands and flutes
5. Formed Tools

A Few Features:

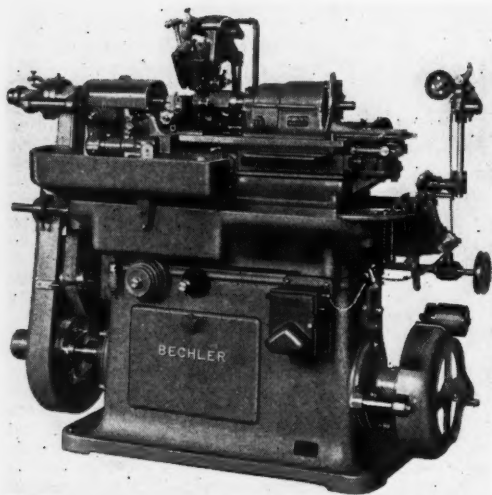
1. Easy Setup without Wrenches
2. Work ground from Shank or on Centers
3. Sensitive grinding — Ball Bearing work Spindle

WRITE FOR ILLUSTRATED FOLDER



TYPE FG1

BERGRAM MECHANICAL ENGINEERING CO., INC.
10 HARTFORD AVE. • NEW BRITAIN, CONN.



Bechler Series BE Universal High Precision Automatic Screw Machine

tools travel longitudinally, the machine being designed so that the stock travels intermittently past the tools. The headstock spindle, which rotates the bar stock, advances and recedes along a slide and pushes the bar through a fixed bushing located just behind the tools. The combined movements of the tools and headstock spindle permit an unlimited variety of work to be formed.

The machine has four tool holders, two horizontal and two vertical, each tool working independently. In addition, two scraped surfaces are provided at the front of the machine to take plain and combined attachments for drilling, threading, and other operations.

The maximum turning length with flat cam, on all six models, is 2½ in.; with bell cam, 4¼ in. Maximum r.p.m. of headstock spindle varies from 4,000 on the Model B12 to 2,600 on the Model B20 machine. The net weight of the machine varies from 780 to 1,800 lbs. according to model. Floor space required from 3½ x 2 ft. to 6 x 4 ft., depending on model. Speed of motor required, 900 to 1,200 r.p.m.

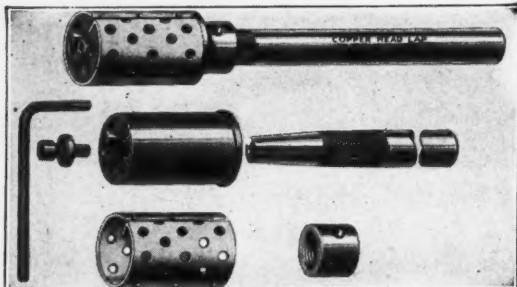
Esco "Mijit" Drill Jig

The Esco "Mijit" Drill Jig illustrated herewith has been designed particularly to meet the requirements of small parts manufacturers. The jig, product of Esco Engineering & Sales, Inc., 2612 Woodward Ave., Detroit, Mich., weighs less than 6 lbs., and the working areas range from 1¼ x 2¼ in the smallest type to 3 x 3 in. in the largest type.

Positive lock is provided. Four distinct models are available, incorporating a standard lift of 1 in. as well as varying locations of guide posts. The locking device can be adapted to other than the four standard drill jigs.

When used as a drill jig, drill bushings are placed in the top plate and work-holding units are fastened to the under side of the top plate and upper face of the base plate, thus properly locating work in relation to drill bushings. Use of holding units also makes the pressure and grip more positive on the part being worked.

Manual operation of the black bakelite ball handle knob fastened on the end of the steel arm operates the jig.



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With Copper Head Expansion Laps. Profitably used in hundreds of lapping shops. Available in sizes from ¼" to 2½", graduated by sixteenths of an inch. Many other designs for special applications.

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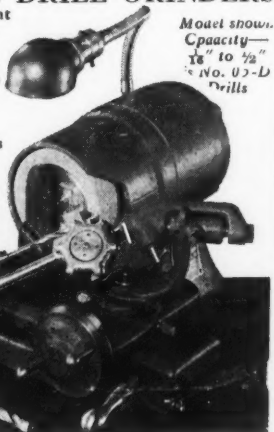
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Model shown.
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Drills

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Sellers

The WESSON ^{all steel} UNIVERSAL VISE



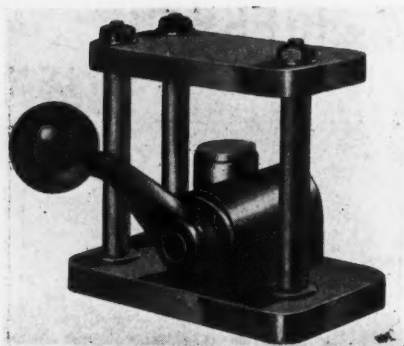
Gives Faster Set-ups More Accurate Angles

The Wesson All-Steel Universal Vise makes the production of accurate compound angles quick and easy. Saves set-up time. Accurate graduations eliminate makeshift measuring. Completely graduated in all planes. Original "cradle" design and all-steel construction provide greater rigidity and permit faster stock removal. Extremely compact; greatest capacity for weight and size. This is a fixture you need! Dealer inquiries invited.

SEND FOR FREE FOLDER

WESSON CO., 1050 Mt. Elliott, Detroit
Please send me Illustrated Folder covering the Wesson Universal Vise.

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City.....State.....



Esco "Mijit" Drill Jig

Releasing and locking of the work in process is accomplished with a minimum of physical effort. Benefits claimed are increased production through quicker loading and unloading time, less operator fatigue, and reduction of rejections due to imperfect work. One jig can be adapted to numerous parts, thus reducing capital investment.

Thermoil-Granodine

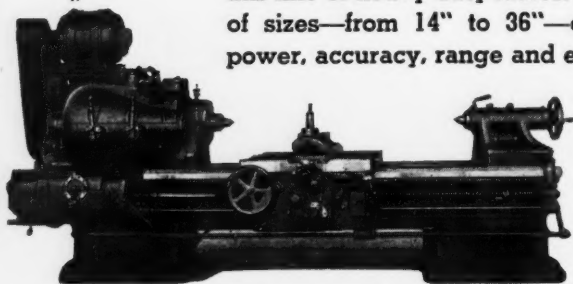
A protection for iron and steel machine parts against friction and corrosion, to be known as "Thermoil-Granodine," has been placed on the market by American Chemical Paint Company, Ambler, Pa. This type of finish can be applied to items such as piston rings, pistons, valve tappets, axles, gears, clips, screws, locks, and so on. The finish is said to be easy to apply in large and small scale production for providing a wear and rust resistant surface on iron and steel.

When iron or steel parts are to be treated with Thermoil-Granodine, they must first be cleaned. The cleaning can be done by using a spirit solvent, or a solvent vapor, or an alkaline solution followed by a water rinse. This treatment prepares the parts for immersion in a boiling solution of Thermoil-Granodine. Here they remain for a time varying from 10 minutes to an hour, during which time the surface of each part becomes an even layer of iron and manganese phosphates.

After the Thermoil-Granodine bath, the parts are rinsed in hot water and then dried. Thermoil-Granodine is available in gallons, kegs and barrels.

Boye & Emmes Lathes

Forty years of specialized manufacture are behind this line of heavy duty lathes. Made in a full range of sizes—from 14" to 36"—each of outstanding power, accuracy, range and economy.



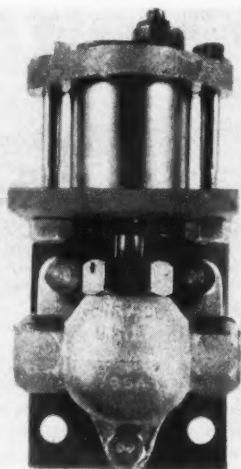
MODEL "E"—24 INCH

*Write for
complete detailed
specifications.*

THE BOYE & EMMES MACHINE TOOL CO.
CINCINNATI OHIO

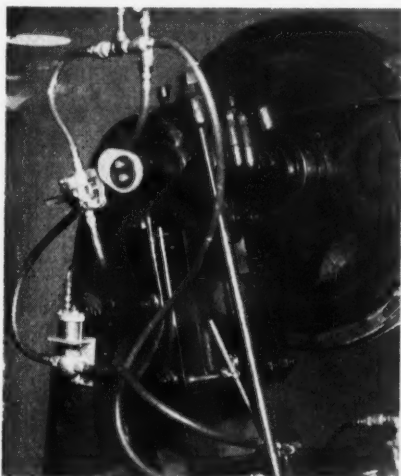
Schrader Pilot Valve

The illustrations show the Schrader Pilot Valve designed to give a delayed or prolonged blast of air for ejecting



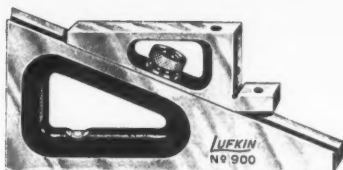
Schrader Pilot Valve

work from a press after the ram has stopped its upward motion. The valve, a product of A. Schrader's Son, Division



Schrader Pilot Valve Applied to Press

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The duration of the air blast may be regulated by a simple screw adjustment on the valve. It is easy to service and conserves air and eliminates the necessity of interchanging machine parts to achieve the results of a timed blast of air. With the vent closed, it may be used as an air control valve on any mechanism.

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Lots of 50
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20" long x 12" wide x 6½" deep.
16 ga., drag holes and handles both ends.

Lots of 100 & 200 less 3%; 300 up less 5%

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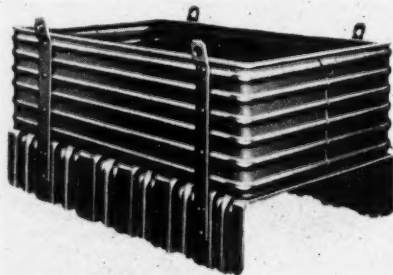
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For core drilling, T. C. and high speed boring, turret tool piloting, etc. Won't stick or clog. Dust proof as a watch. Write for details.

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1312 Mt. Elliott Ave. Detroit, Mich.

"Union Metal" All Steel Lift Truck Platform

An all steel lift truck platform with double corrugations has been announced by The Union Metal Manufacturing Company, Canton, Ohio. The platform is available in all the customary varia-

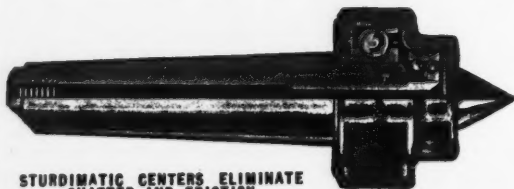


"Union Metal" All Steel Lift Truck Platform
with Steel Corrugated Platform Box

tions including a complete line of steel corrugated platform boxes.

The patented platform corrugation consists of two half-round recesses joined by a raised center rib. Both the recesses and raised rib traverse the entire deck of the platform, rolling over the knee in a gradual curve and down the legs. It is claimed that this construction gives exceptional strength at the knee where the usual point of failure occurs. In flowing over the bend the center rib acts as a knee brace or gusset, in traversing the deck it acts as an integral bar brace, and in the legs it acts as a bar brace stiffener.

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New Literature

Janette A.C. and D.C. Generators are the subject of a four-page bulletin released by the Janette Mfg. Co., 556 W. Monroe St., Chicago, Ill. Illustrations of the various types of A.C. and D.C. generators together with specifications are included.

Bulletin 12-25 is punched with holes for insertion in a Janette folder and will be sent free upon request.

"Standard" Dial Bore Gages for the accurate measurement of bore diameters are the subject of a four-page folder issued by Standard Gage Co., Inc., Poughkeepsie, N. Y. Four types of gages are available—Standard, Pistol-Grip, Vertical, and Vertical 90-Degree—each type being supplied in five sizes to cover diameters from 1 to 12½ in. Diameter extensions are furnished with each gage. Copy of the folder free upon request.

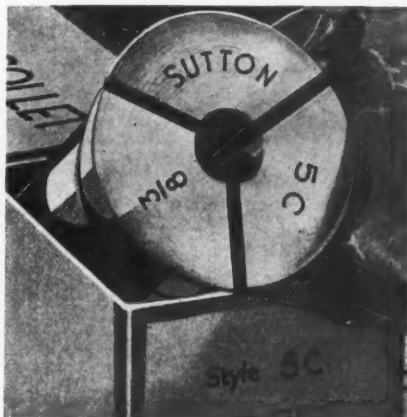
"Ryerson Lead-Bearing Steels" is the title of a bulletin describing remarkable lead-bearing open hearth steels which are said to improve machinability from 20 to 40 per cent and increase tool life without sacrificing the desirable qualities of open hearth steels. The lead-bearing steels are available in a wide range of analyses. The bulletin includes results of actual machining tests. Copy free by addressing Joseph T. Ryerson & Son, Inc., 16th and Rockwell Sts., Chicago, Illinois.

"Greater Industrial Safety," a compact 12-page booklet stressing ways in which modern cleaning methods and materials provide increased safety of plant, product and personnel, has been issued by Oakite Products, Inc., 36 Thames St., New York, N. Y.

Designed to serve as a guide pointing out various industrial maintenance operations where improved safety is an essential factor, the booklet concisely reviews effective ways to eliminate commonly recognized fire hazards and fire-hazardous conditions. Also discussed are the avoidance of certain well-known occupational hazards and the safeguarding of health through proper plant sanitation maintenance practices. Copies are available free on request.

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MADE from specially selected alloy steel. Expertly heat-treated to correct spring temper to resist wear and give a grip with a strong comeback. . . . Threads chased with single-point tool to insure perfect alignment with draw bar. . . . Precision ground inside and out to insure accuracy of taper and concentricity of hole.

Send for Sutton Bulletin listing Collets for all makes of lathes and milling machines.

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2842 W. GRAND BLVD. DETROIT, MICH.

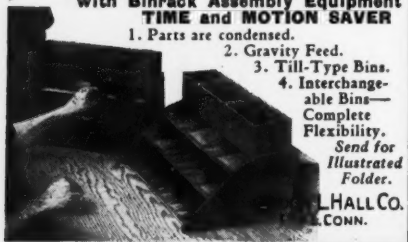
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HI-SPEED TOOLS, Ltd. Galt, Ont.

Hannifin Pneumatic Arbor Presses. This eight-page bulletin released by the Hannifin Mfg. Co., 621-631 S. Kolmar Ave., Chicago, Ill., illustrates and describes Hannifin standard and special type pneumatic arbor presses for assembling, broaching, molding, keyway cutting, oil grooving, straightening, bending, forming, and other operations involving the application of pressure. A dimensional drawing of a Hannifin Pneumatic Arbor Press together with complete specifications for each type or model press is given. Copy of Bulletin No. 46 free upon request.

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THE V & O Press Co., INC.
HUDSON N. Y.

Tannewitz Model 24-M Di-Saw is the subject of a 12-page circular now being distributed by The Tannewitz Works, Grand Rapids, Mich. The construction and operating features of the Di-Saw are thoroughly described and illustrated. Typical savings obtained through the use of the machine are explained, and complete specifications are listed. Copy free upon request.

Rockford 12, 14, and 16-In. Economy Lathes. This four-page bulletin, published by the Rockford Machine Tool Co., Rockford, Ill., presents by means of description and photographs the features and advantages of the Rockford 12, 14, and 16-In. Economy Lathes which are available in geared head and cone head types. The bulletin also includes a complete table of specifications. Copy free upon request.

"Facts About Grinding Wheels" is the title of a 76-page booklet released by the Norton Company, Worcester, Mass. The booklet is divided into three parts, the first of which is devoted to a discussion of the types of grinding, the physical characteristics of grinding wheels, the two abrasives and five general types of bond used in the production of Norton wheels, and Norton grinding wheel markings for denoting kind of abrasive, grain size, grade, structure, and bond. The second part discusses the four constant and four variable factors to consider when making the selection of grinding wheel specifications and, in addition, contains tables of minimum wheel spindle diameters, speeds, and grinding wheel recommendations. The latter section of the booklet includes general grinding information. Copy free to mechanical executives upon request.

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"Chicago" Steel Hand Bending Brakes are the subject of a 32-page illustrated booklet published by Dreis & Krump Mfg. Company, 7418 Loomis Blvd., Chicago, Ill. The text covers standard hand brakes, box and pan brakes, portable hand brakes, universal hand brakes and attachments, hand folder brakes, and special hand brakes. Copy free upon request.

HP Springs. A data sheet giving complete specifications and prices for the compression type springs marketed by Hardware Products Company, 103 Richmond St., Boston, Mass., is now available to the trade. Copy free upon request.

Shim Application Chart. Laminated Shim Company, 21-30 44th Ave., Long Island City, N. Y., is now distributing a handy chart which places in the hands of present and potential shim users a comprehensive survey of proved applications for laminated shims or shim stock.

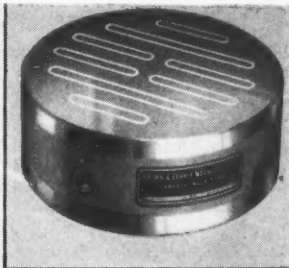
The applications listed are arranged for easy reference and generous illustration of installation methods makes the chart a handy guide. With it, any industrial executive can quickly check his shim applications to ascertain whether or not he is taking full advantage of the use of laminated shims throughout all of his machine assemblies or servicing.

Copy of the Shim Application Chart free to any mechanical executive or production engineer upon request.

Morse Flexible Couplings. A 32-page comprehensive catalog of Morse Flexible Couplings is now available to all users of industrial, automotive and marine couplings. The catalog, designated as Bulletin No. 57, contains complete engineering data, installation and operating information, and recommended applications for the entire Morse Flexible Coupling line—silent chain couplings, roller chain couplings, Morflex couplings and universal drive shafts, and Morflex Radial couplings and universal drive shafts.

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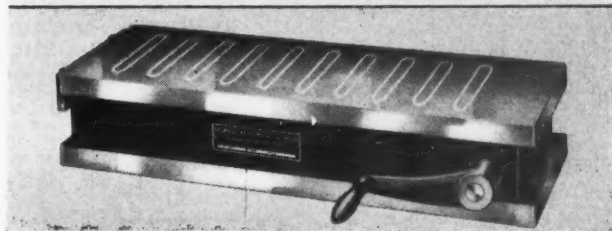
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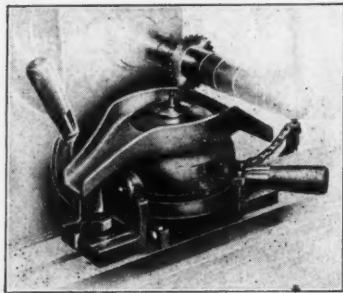
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Rotor "Powerplus" Grinders. Four "Powerplus" air grinders, Types D-75, D-80, D-100, and D-300, are illustrated and described in this 12-page catalog prepared for distribution by The Rotor Tool Co., 17325 Euclid Ave., Cleveland, Ohio. Construction and operation of the twin motor provided with each type grinder is discussed in detail. Tables of specifications are included. Copy free upon request.

Marking Devices. The complete line of metal stampings, dies and tools, and marking devices manufactured by The Dickey-Grabler Company, 10302 Madison Ave., Cleveland, Ohio, is presented in Catalog No. 37, now being issued by this firm. Products listed which are of interest to the metal manufacturing industry include dies and tools for metal stamping and embossing, tool room and employee's checks, name plates, steel letters and figures, stencils, punch press products, automatic numbering machines, and so on. Copy free to any plant executive upon request.

"Protection of the Eyes for Welding with Lincoln Super-Visibility and High-Visibility Lens" is the title of a four-page bulletin now being issued by The Lincoln Electric Co., Cleveland, Ohio. The effect of ultra-violet, visible, and infra-red rays on the eyes and the use of the proper lens to protect the eyes from these rays are explained by means of description and sectional drawings. A discussion of the use of the Lincoln Super-Visibility and High-Visibility Lens for arc welding is contained in the bulletin. In addition, the bulletin includes a chart showing the comparison of Lincoln lens specifications and qualities with Federal specifications. Copy of Bulletin No. 359 free upon request.



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Machinery's Handbook. (Tenth Edition.) 1,815 pages, 4½ x 7 in. Published by The Industrial Press, 148 Lafayette St., New York, N. Y.

This Tenth Edition is the most complete edition of "Machinery's Handbook" ever published. This edition contains 585 pages of important new matter not found in editions earlier than the Sixth, 447 pages not found in the Eighth, and 250 pages not found in the Ninth Edition. The new material consists mainly of very important new or revised engineering or manufacturing standards, machine shop data, and a vast amount of general information required by the designers and builders of all types of machines or other mechanical products.

The new features include standard mounting dimensions, with horsepower and speed ratings for different types of motors; the British standard limits and fits for holes and shafts; the American standard for different gages; selection of tool steels for different classes of tools; additional data on various screw thread standards; tables for checking gear sizes by the pin and chordal methods of measurement; standard grinding wheel shapes and dimensions; standard forming tool blanks; standard tolerances for forging; American standards for drawings and standard abbreviations and symbols; selection of lubricants for bearings; standard V-belt drives; steels for gearing; brass, bronze, and non-metallic gearing; recent set-screw standards; new hardness conversion tables; checking screw thread sizes, and numerous other new subjects.

The Tenth Edition includes, of course, many standard features found in earlier editions, such as mathematical and other tables not subject to change. The complete book is divided into 134 main divisions, featuring subjects of importance to everyone responsible for the design or construction of anything mechanical.

Dayton Rogers Model "C" Pneumatic Die Cushions for Punch Presses are described and illustrated in four-page folder issued by Dayton Rogers Mfg. Co., Minneapolis, Minn. The cushions are designed particularly for difficult forming operations, deep drawing operations requiring rigid and extreme ring holding pressures, and accurate alignment for both stripping and difficult ejecting operations. Copy free upon request.

Winter Brothers Taps and Dies. A catalog and handbook of valuable information and tables designed to simplify the selection of the right tap or die for any threading job is now being distributed by The Winter Brothers Co., Wrentham, Mass. A copy of Catalog No. 18 will be sent to any mechanical executive who will address a request on his company letterhead.

Mathews Conveyor Handbook. Catalog No. HB39. A handbook designed especially for engineers and plant operating personnel, designated as Catalog No. HB39, is now being issued by Mathews Conveyor Company, Ellwood City, Pa. The handbook is pocket size, 4 1/4 x 6 1/2 in. overall, and contains 384 pages of engineering material describing and illustrating practically every type of conveying mechanism available.

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Abrasive 3B Surface Grinding Machine, product of the Abrasive Machine Tool Co., East Providence, R. I., is illustrated and described in a 16-page folder now being distributed by this firm. A separate description of the operation and construction of each part which makes up the assembly of the 3B Machine is contained in the folder and cross-sectional drawings of several of these parts are included. Attachments and special features of the Abrasive 3B Machine are also illustrated and described, and complete specifications are listed. Copy free to production executives upon request.

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"Getting the Count with Productimeters" is the title of a six-page bulletin now being issued by the Durant Mfg. Co., 1932 N. Buffum St., Milwaukee, Wis., covering this firm's line of counting machines for measuring wire and cable of 0.005-in. diameter and up. Several different models and types are illustrated and described and specifications are given. Copy of Catalog Section 3 free upon request.

Milne Tool Steel Selector Table. A. Milne & Co., 741 Washington St., New York, N. Y., has published a four-page folder entitled "Milne Tool Steel Selector" giving the distinctive features, name, bar color, analysis, and general physical properties, included impact values and compressive strength, of Milne high speed, alloy tool, carbon tool, and graphitic steels. Copy free upon request.

MODERN Machine Shop

CINCINNATI, OHIO

JULY, 1939

VOL. 12, No. 2

Uses of Matrix Alloy in the Construction of Metal-Stamping Tools

By C. L. SZALANCZY

Tools and Equipment Department, Westinghouse Electric & Manufacturing Co.
East Pittsburgh, Pa.

STAMPING plants in all large industries that use stamped parts made of paper, fiber, mica, plastics, rubber and various types of metal are being used more and more as feeder sections or suppliers for assembling departments, largely as a result of the general trend towards reducing manufacturing costs. In modernizing and building less bulky and stronger equipment and apparatus, castings are being redesigned and replaced by parts fabricated in the punch press. A great deal of advancement has been made in the design and construction of punch-press tools, and these tools are now built in such a manner as to reduce the construction time to the minimum. Much of this advancement has been achieved by standardizing different die parts so that these parts can be made up in quantities and kept in

stock, to be used as needed, by drawing them from the storeroom in the tool department.

The tools are designed by experts in their line of work, who, with their past experience and knowledge to rely on, are constantly devising new methods of construction. In the past, even the larger types of press tools were frequently made of solid steel blocks in order to obtain the necessary amount of body around the cutting surfaces or sides to assure prevention against breakage. This method was, of course, costly in more ways than one. In the first place, tool steel that is larger than the regular bar sizes costs more per pound than the standard market sizes. In the second place, such stock is not easily available and has to be specially ordered from the manufacturer. The time required in

getting the shipment of steel in many cases delayed the progress of the work along the entire assembly line.

Another disadvantage of large tools of the solid type was the difficulty in maintaining their shape. Quite frequently in the hardening process the parts lost their original shapes, which meant considerable unforeseen

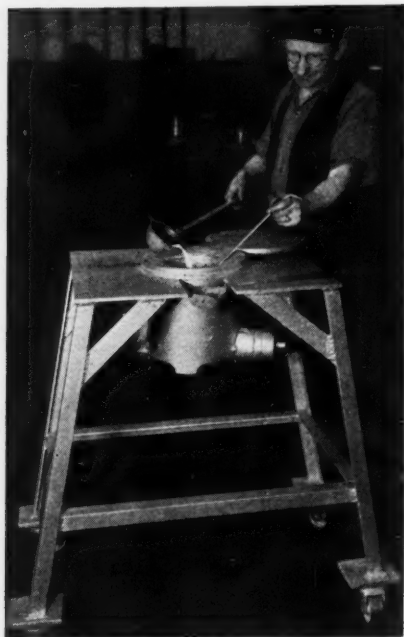


Fig. 1—Crucible used to melt matrix alloy.

expense in time required for grinding or stoning the die part back to its original position. In some cases even this could not be done, because the steel had warped so much that parts had to be made over. It is easy to see why many of the tools were so expensive.

In the past few years tools have been made smaller and in most cases assembled from smaller pieces of tool steel, ground to fit together at the

adjoining edges and held to the shoe or mounting plate by means of bolts and anchored with the necessary number of dowels. In addition, a shrink ring or frame has been used to keep the steel pieces from spreading at the top. While this method was a step forward in tool construction, it was still quite costly because the shrink rings had to be laid out carefully and machined accurately to assure a perfect fit around the die pieces. Furthermore, in case of breakage of a die part, it required a considerable amount of time to make the necessary repairs.

In view of these facts, tool engineers got together to discuss various ways and means whereby the sectional method of tool construction could be employed in a manner that would speed up construction and at the same time make repairs quicker and more simple. During one of these discussions the idea was advanced that if the shrink ring or frame were roughly burned out on the inside to a dimension somewhat larger than the assembled die pieces, and a molten alloy was poured into the opening between the die parts and the frame the problem might be solved.

With this idea in mind, various tools were designed and made. Different kinds of alloys were tried out. Some worked more efficiently than others, but since the natural tendency of the metals was to shrink during the cooling, it became necessary to cork the filling material into place. This method did not prove satisfactory either, since the hardened alloy held tight to the points only as far as the corking action went and left the balance of the metal loose. Another method was tried in which a small amount of alloy was poured at one time and when cooled sufficiently was corked followed by another application of

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molten metal. This method also proved unsatisfactory, since it was found that the alloy rested in layers and did not fuse or melt together. Altogether, it seemed that a good

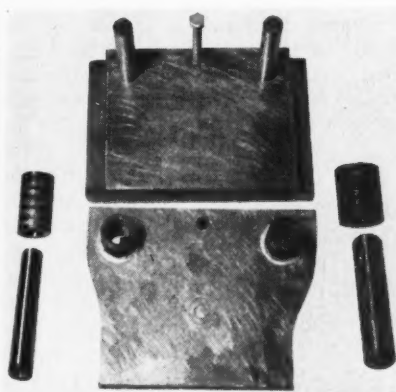


Fig. 2—Showing a Westinghouse die set in which the bushings are held in place with matrix alloy.

idea in tool making was about to be lost to industry. Then a new alloy, to be known as Cerromatrix, was introduced to the metal stamping and tool making industry.

The new alloy is made of a composition of lead, tin, bismuth and antimony. On various tests the tensile strength of the matrix metal has been found to be about 13,000 pounds per square inch with a Brinell hardness of 19. During these tests the elongation was about one per cent in two inches. During cooling an expansion of approximately 0.002 in. per inch takes place; directly the opposite of the previous alloys, which always shrank during the cooling. This point was the deciding factor in sectional die building, since

it proved that the original idea of the tool engineers was right, the alloys alone being wrong. The use of matrix metal provides a quick and accurate method for both locating and holding the various die parts in position.

Tests showed also that under normal conditions the matrix alloy will resist 16,000 pounds per square inch for thirty seconds without deformation. The melting point of the matrix alloy is very low—120 deg. Centigrade—a feature that was also found to be an advantage. Because of this low melting point, the heat of the molten alloy does not have any effect on the hardness of the tool-steel die parts in contact with it. The pouring temperature is from 149 deg. Centigrade to 177 deg. Centigrade, and the freezing or hardening range of the alloy is from 127 deg. Centigrade to 102 deg. Centigrade. Another uncommon feature of this alloy is that it hardens with age. For this reason it is advisable to allow the tool to set for 12 to 15

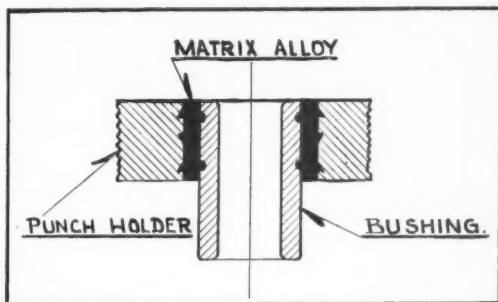


Fig. 3—Illustration shows a bushing set in the punch plate.

hours before placing the tool in production.

The toolmaker should have no difficulty in applying or pouring the molten matrix alloy into the die assembly. Fig. 1 shows the unit used

to heat and melt the alloy. As shown by the illustration, it is a frame made of angle iron and mounted on casters or wheels so that it may easily be pushed to the toolmaker's bench. A crucible mounted in it is electrically heated. If desired, the crucible may be preheated at its original location and wheeled to the toolmaker's bench when he is ready to pour the metal. It is best to have the crucible mounted so that

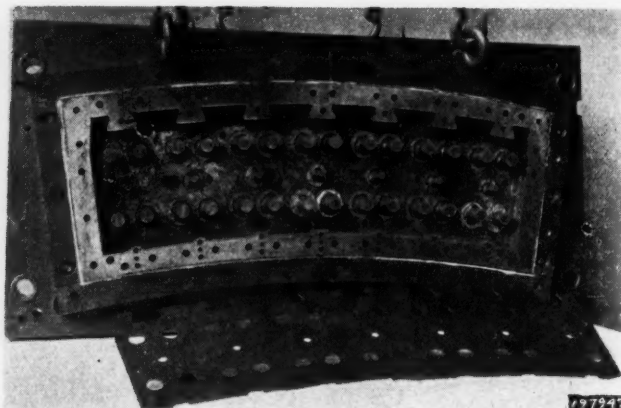


Fig. 4—A large die of the sectional type, held in the frame with matrix metal.

it can be moved from place to place; otherwise the tools must be moved, and in the moving some of the die parts may get out of line and cause unnecessary delay. Again, it is the best arrangement, since it is so much more difficult to handle and move large die parts. In this manner the tool can be set up and clamped into position, all set to pour the molten matrix metal.

The ladle used to pour the molten metal in place is of special cast steel and is also electrically heated, somewhat like an electric soldering iron. While this ladle is not capable of melting the material, it can main-

tain the temperature at pouring stage for a considerable length of time. Some impurities collect on the top of the molten mass, and for that reason care should be taken to stir the molten alloy well before taking out a ladleful.

Figure 2 shows a simple die set made in the tool room. It is equipped with guide or leader pins and their corresponding bushings are held in place with matrix alloy. The die

shoes are bored oversize for the bushings and are then nicked or chipped on the diametral periphery with a diamond-point cold chisel, which is done so as to make a number of indentations into which the molten matrix may flow and prevent it from working or pulling out. It must clearly be understood that the

matrix alloy does not fuse in any manner or adhere to the metals with which it may come in contact. The only means of keeping it in place is by providing anchorages or slots or other type of cavities into which the matrix alloy can flow. With this and its natural tendency for expansion, the bushings are held fast and in alignment with the pins in the lower die part.

To make the shoes, steel sections of the required size are burned out to shape and are surface ground both on the top and bottom. No other machining is necessary, the guide pins being made with a taper on

the lower end which permits them to be force-fitted into the lower shoe. The bushings are placed over the guide pins and the entire die set is turned upside down in a special jig. The upper shoe is now on the bottom, and the opening between the bushings and the punch shoe may be filled with the molten matrix alloy. After the alloy has cooled, the die parts are set aside to be used the following day.

The usual procedure is to make up a number of die sets at a time and have them ready for use as required. In this manner the alloy has ample time to harden, and it is cheaper to make several sets at the same time with the same machine setup and while the tools are at hand.

A sectional view of a bushing set into a shoe with matrix alloy is shown in Fig. 3. The necessary grooves for holding the parts in place and the diamond-pointed notches in the shoe are clearly shown. Fig. 4 shows

a part of a large die assembled from small sections of tool steel inside of a retaining plate. Another plate, in which the round punches are held in place by the use of matrix metal, is shown mounted inside the die. This tool measures 28 in. by 54 in. over-all and weighs 6,000 pounds. Making such a die by the sectional method saves considerable time and expensive labor. Also, in case of breakage occurring in the die, the part thus affected can be quickly repaired by melting the matrix alloy

around the broken part and removing it. After the replacement has been made, the area around that part is heated and again filled with molten metal, which flows into the alloy already in place and upon cooling becomes again a solid mass. Fig. 5 illustrates the method of pouring the molten matrix around a large seg-



Fig. 5—This illustration shows the method of pouring molten matrix around a segmental die.

mental die of typical design.

In Figs. 6, 7 and 8 the proper method for locating and holding the punches and applying the matrix alloy is illustrated and explained. Fig. 6 illustrates the individual parts of the punch or upper member of a piercing and blanking die. It also shows the order in which the parts are placed when the punches are being set up prior to being anchored in position with the molten matrix alloy.

The completed die is indicated at

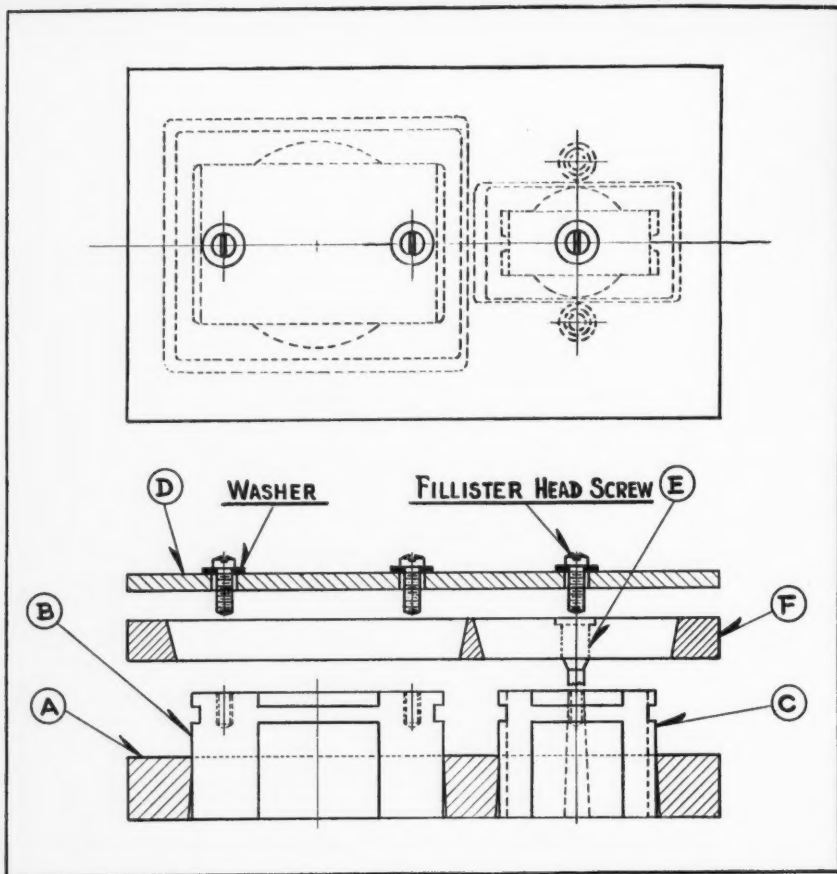


Fig. 6—Drawing showing arrangement of punch parts before they are fastened together.

A. It has been removed from the die shoe and is employed to hold the punches in their proper positions. The die part A is used only until the punches B and C are properly aligned and fastened to the top plate D, which is made from a piece of cold rolled steel. The punches are provided with retaining grooves or shallow holes into which the matrix can flow, and a $\frac{1}{4}$ -20-thd. tapped hole is provided at the top for fastening

the punch to the top plate with a fillister-head screw. The holes in the top plate are purposely made larger so as to allow for movement for the screw in any direction required. The die may be now removed and replaced on the die shoe permanently.

The punches C and B are made from tool steel, finish machined or ground to shape and hardened to the proper specification. The two small round punches E are press-fitted in

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their respective positions. The holes for these punches are bored in the punch plate on the profiler. For proper locating, the die may be used as a template. The punch plate is either machined or burned out, the openings being a little larger than

Figure 7 shows the assembly with the punches correctly aligned and fastened. Two spacer bars are used to keep the space between the punch plate and the die equal. The top plate and punch plate are then clamped together with two clamps.

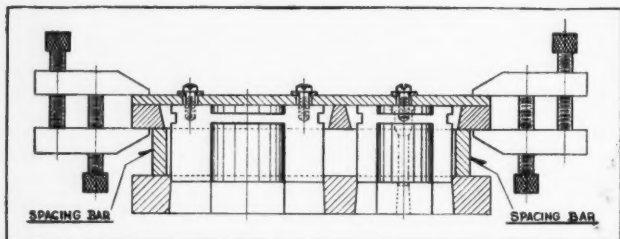


Fig. 7—Punch parts assembled, properly spaced and fastened. The two large punches are located from the die.

the punches and tapered towards the back or upper side. This is to prevent the matrix from pulling out when the tool is in operation. The top plate **D** serves two purposes. One is to back up the punches and keep the molten alloy from escaping. This also tends to keep the top surface smooth. The other is so that the punches will be held in position with the punch-holder plate **F**.

The die is now removed and the spacer bars can be taken out. The entire punch assembly is turned upside down and placed either on parallel bars or into a vise. The punch assembly is now in position for applying the molten matrix alloy. Before the alloy can be applied, however, both the top plate and the punch holder plate must be preheated to a temperature that is nearly that of the melting point of the alloy to prevent sudden chilling of the molten matrix. It is quite obvious that in applying the heat to the plates, it must be done from the bottom. Care should be taken not to allow flame to come in con-

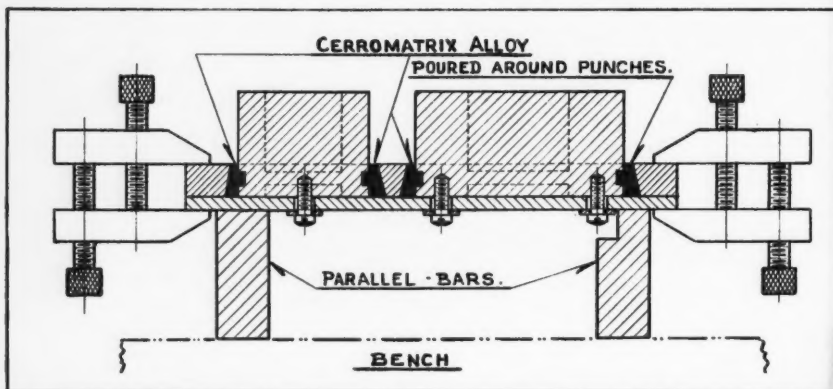


Fig. 8—Drawing illustrating punch assembly in the finished state.

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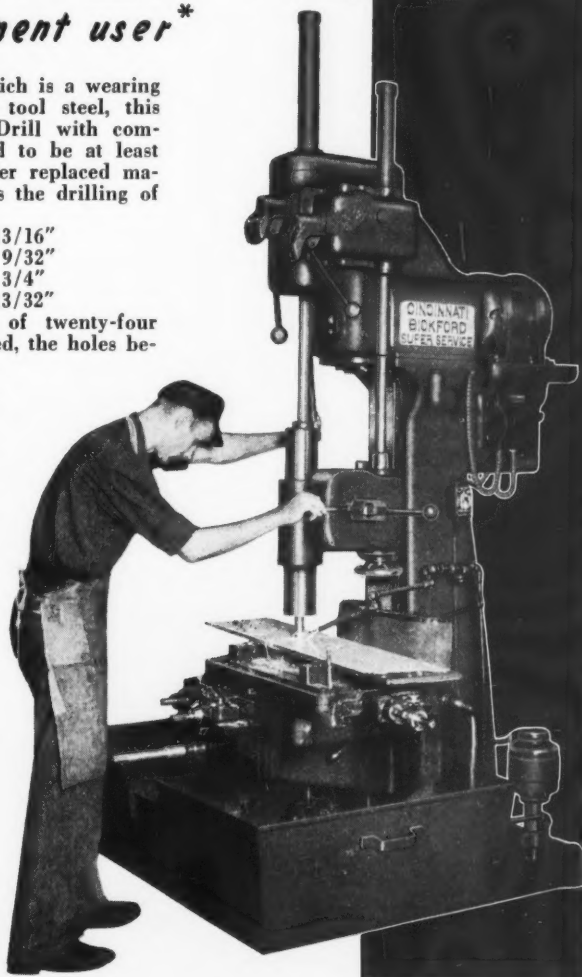
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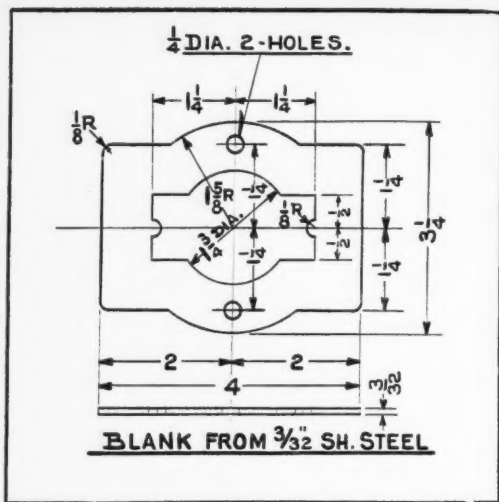


Fig. 9—The blank shown here was produced with the punch shown in Fig. 8.

tact with matrix metal, also not to permit steel parts adjacent to the alloy to become hotter than 120 deg. Centigrade.

Figure 8 shows the punch assembly in the finished state, the matrix alloy being indicated by the black portion between the punches and the punch plate. The alloy should be left to cool and harden thoroughly before the clamps are removed. After the clamps and the top plate have been removed, the punch assembly is

ready to be mounted on the punch shoe.

Figure 9 shows the blank that is produced by the die and the punch assembly shown in Fig. 8. Fig. 10 shows a stripper that was made for the die. The method employed for its construction is the same except that the taper is run from the center of the plate toward both outer sides, as shown in the illustration.

Krembs "Fluxine" Chart which lists metals in general or common use and indicates fluxes, rods, and spelters for joining these metals is now being distributed by Krembs & Co., Chicago, Ill. Detailed information regarding various numbered "Fluxine" fluxes for brazing, welding, and silver soft soldering is included. Copy free upon request.

Crucible Die Steels. Detailed information regarding Crucible high carbon high chromium die steels is given in an eight-page folder published by the Crucible Steel Co. of America, 405 Lexington Ave., New York, N. Y. Working instructions for the high carbon high chromium die steels together with a list of the various uses to which these steels can be applied are included in the folder, copy of which will be sent free upon request.

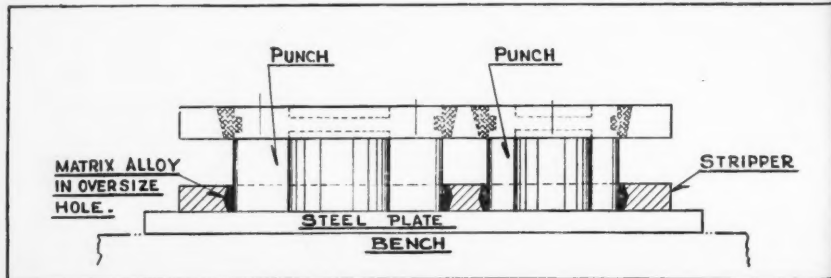


Fig. 10—Stripper made by pouring matrix alloy around the punches.

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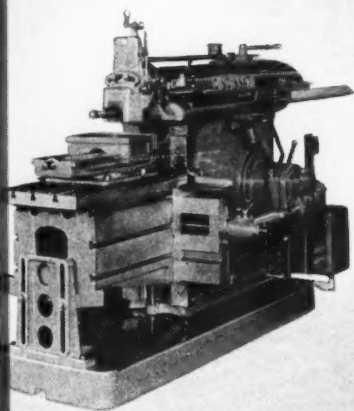
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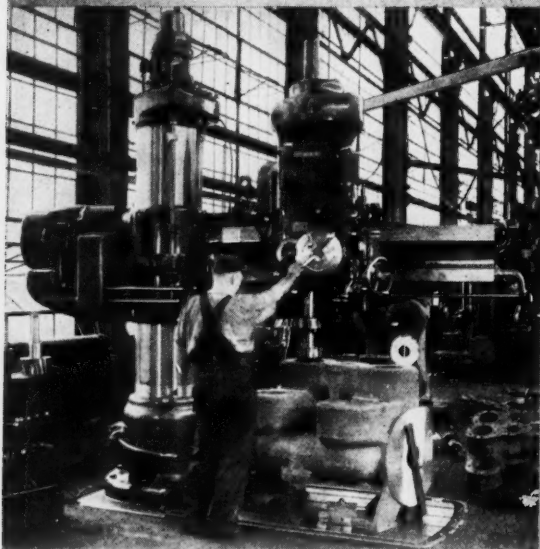
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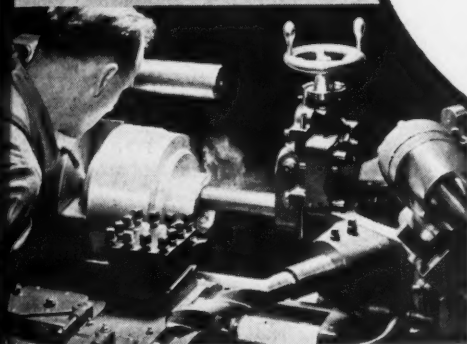
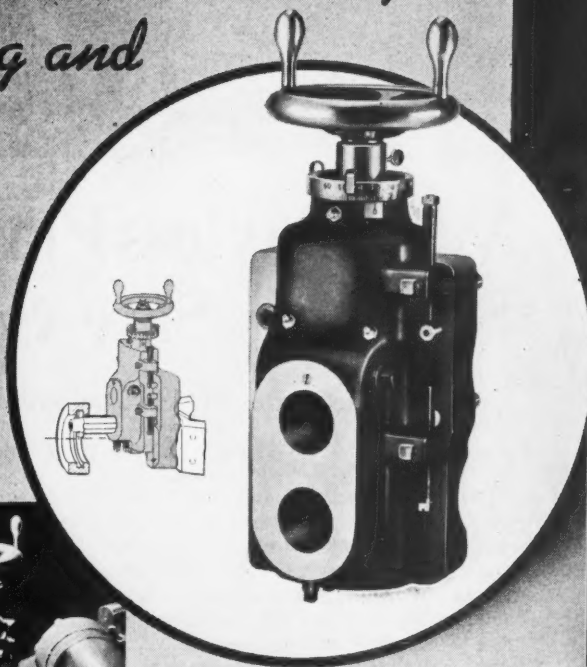
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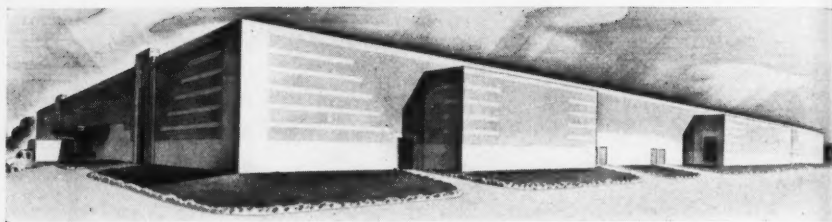
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THE Simonds Saw and Steel Company, Fitchburg, Mass., is now occupying its new plant, comprising mainly a single windowless room five acres in area. Operations previously carried on in three old plants covering 17½ acres are accommodated in this building with almost an acre to spare. There are only 56 intermediate columns in the entire structure, arranged to form eight 70-ft. aisles with column supports every 40 feet.

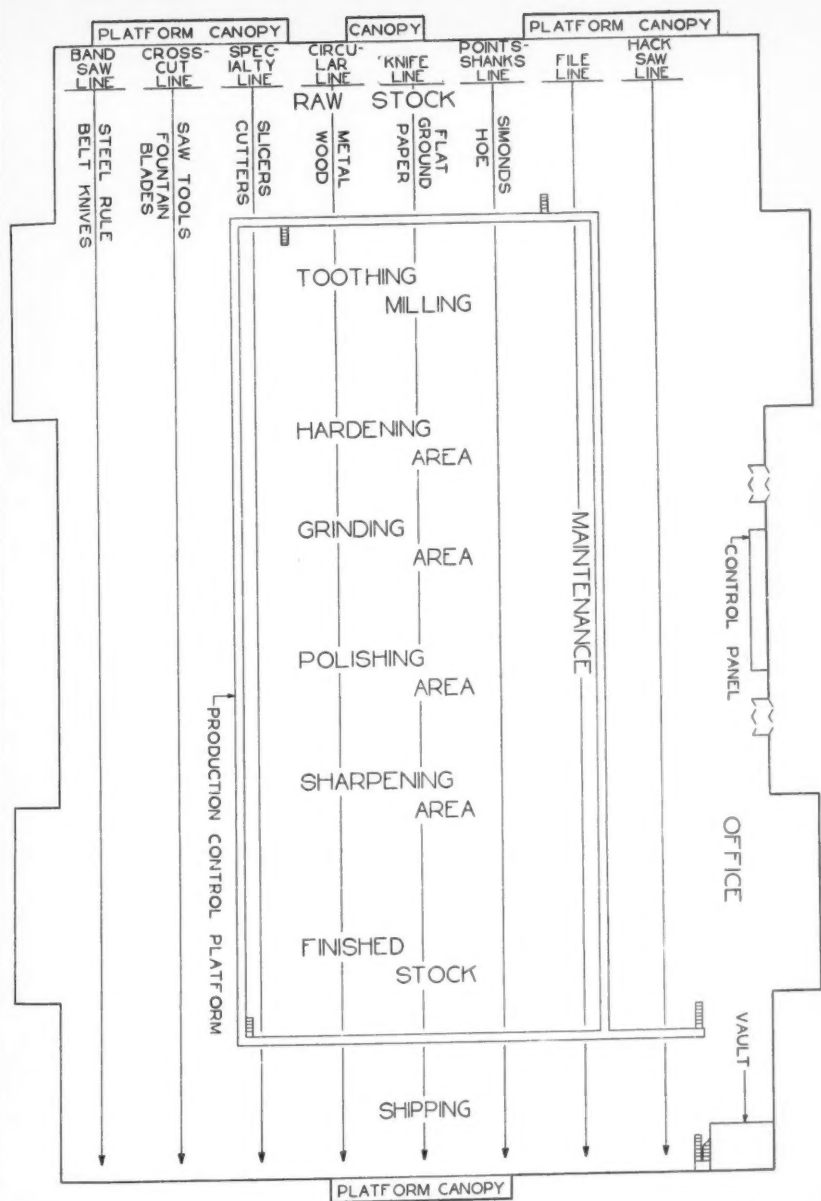
Structural steel for the building was entirely shop welded (1,020 tons) and includes special jack trusses which support intermediate roof sections.

The roof is of a special design which provides maximum insulation with a minimum weight and the underside of the ceiling is of perforated metal of hollow rib design, into which slab cork has been placed. This, in turn, is covered by two ½-in. layers of insulated board in staggered arrangement, and the entire roof is topped by a 15-year bonded water-proofing.

Service facilities, including coat rooms, wash rooms and lavatories, as well as air conditioning units, are located in four lean-to additions which extend out from the side walls on east and west.

The outer walls are composed of buff-colored face brick and used common brick, arranged in a dramatic design with contrasts which emphasize the horizontal sweep of the entire structure. A dead air space has been provided between the outer wall and the inner wall, the latter being of acoustic type cinder block.

Daylight is completely excluded by the solid walls, permitting complete control of illumination without any variation day or night the whole year round. Lighting fixtures of a new revolutionary type provide 50 lumens of light per watt at 1,440 positions throughout the plant. The fixtures, each of which consists of a 100-watt fluorescent lamp, are mounted 16 ft. above the working floor and provide uniform shadowless illumination of 20 foot-candles or better throughout



Floor Plan of Simonds Plant Illustrating Production Flow



View from South End of Plant. Note Walkway Suspended Above Equipment for Observation Purposes.

the room. The lamp is a recent development, designed by the General Electric Vapor Lamp Company, specifically for industrial application. Light from the new unit is blue-white in color, with a sufficient amount of red rays present, however, to serve practically all industrial requirements.

Nine major production lines extending the length of the plant have been set up with all service lines, including water, gas, steam, power, light, air, and oil carried direct to more than 1,000 machine and furnace locations. A four-ft. steel walkway, a quarter mile in length, is suspended from the trusses to provide the means of observing operations throughout every portion of the plant.

More than 38,000 ft. of piping (approximately $7\frac{1}{2}$ miles), including 10,000 ft. of cast iron pipe, 7,000 ft. of welded steel pipe, 10,000 ft. of black iron pipe, 5,600 ft. of galvanized iron pipe, and 6,000 ft. of brass

pipe, were required and have been almost evenly divided between underground locations and overhead installation in the roof trusses all alongside the columns.

Special power ducts totaling 17,000 lineal ft. were installed on 10-ft. centers throughout the plant and have access openings every two feet. They are equipped with 280 standard and 265 special splice boxes. The installation of galvanized iron conduit totaled 60,500 ft., whereas 177,000 ft. ($30\frac{1}{2}$ miles) of wire and cable were required.

The plant has a connected power load of 6,000 h.p. and a total of 4,200 electric outlets, including light, machine power, transformers, switchboard, motor generators, and so on. All power entering the plant is controlled through a 66-ft. main switchboard just inside the west wall, beyond which transformer banks and switch houses are located.



MORE NEWS

about STRESSPROOF* No. 2

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Parts made from STRESSPROOF No. 2 are ready for service following the last machining operation because as received by you, STRESSPROOF No. 2 has a minimum yield point of 100,000 lbs. per sq. in.; *unique wearability* and freedom from warpage.

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All dust and exhaust gases developed in production operations at the plant are removed at their sources through underground networks of ducts. Thirty dust removal units serve many times that number of machines through under-floor ducts connecting each such unit with other machines in the same area. The dust is removed and the air is passed through a filter screen and re-circulated in the room.

Three underground flue gas exhaust systems with fans which draw the gases directly away from the furnaces and other units at 63 different positions to the outside are insulated with a corrugated asbestos and all metal in these systems is covered with a special type of asbestos cement.

While the entire plant is air-conditioned and controlled through hydrostats and thermostats at four

strategic positions, special man cooler systems have been provided for the comfort of men working at the furnaces.

To meet the extraordinary requirements of the huge windowless plant where heat treating furnaces, annealing ovens, and more than 1,000 individual motor driven grinders, cutters, and other machines are operated in a single room shared by the factory offices, engineers of the Austin Company and the Carrier Corporation collaborated in the development of an evaporative cooling system.

Air is circulated through the building at a rate of approximately 400,000 cu. ft. a minute, coming into the structure through louvers on the end walls of four lean-to buildings which adjoin the manufacturing plant at points near the corners on either side of the structure. Water used as coolant for the system is provided by



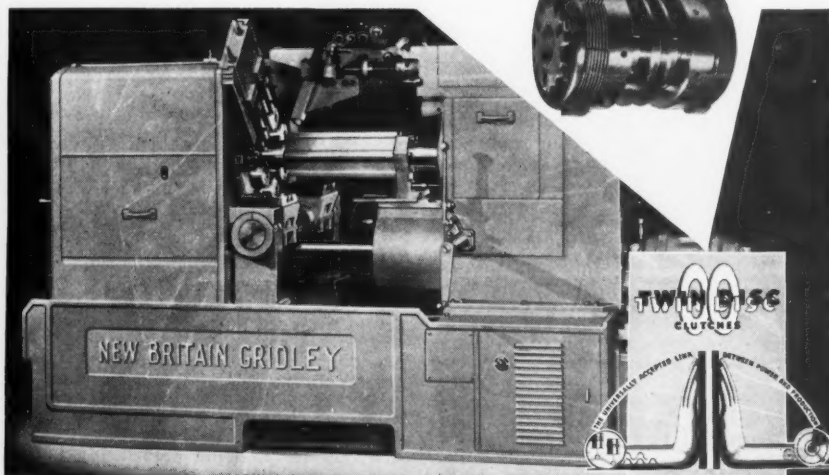
View from North End of Plant. Shadowless Illumination is Provided by 100-Watt Fluorescent Lamps.

No Spindle Lag!

When the Twin Disc Clutch which drives the spindles on this multiple screw machine is released, the spindles stop almost instantly, instead of slowly coming to rest. ♪ When the clutch is "thrown out," the multiple driving and driven plates of the clutch separate immediately by an appreciable distance. There is no continued slight contact. As a result the spindles come to rest with minimum lag. ♪ This immediate response of the spindles saves time—makes the screw machine a better producer for the user—a better seller

New Britain multiple spindle screw machine equipped with 2 Model CC Twin Disc Clutches.

for the manufacturer. Write for recommendations. Twin Disc Clutch Company, 1326 Racine St., Racine, Wis.



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● California: Los Angeles, Charles W. Carter Co.; San Francisco, Charles W. Carter Co. Colorado: Denver, Liberty Trucks and Parts Co. Illinois: Chicago, Motive Parts Co. of America; Chicago, Western Contractors Supply; Chicago, Wisconsin Industrial Parts. Massachusetts: Boston, Rapp-Huckins Co., Inc. Kansas: Great Bend, Scheuffer Supply Co. Maine: Portland, Southworth Mach. Co. Michigan: Detroit, Whitney Bros. Minnesota: St. Paul, Truck Parts, Inc. Missouri: St. Louis, Auto Parts Co. New York: Buffalo, Edward W. Rode; New York City, Twin Disc Clutch Parts and Service of New York, Inc. Ohio: Cincinnati, C. McCash; Cleveland, Industrial Eng. Parts. Oklahoma: Tulsa, Twin Disc Clutch Co. Pennsylvania: Pittsburgh, Contractors Equipment Service Co.; Philadelphia, Maerky Mach. Works. Tennessee: Knoxville, Auto Equipment & Supply Co. Texas: Dallas, Twin Disc Clutch Co.; Fort Worth, John Muller Co.; Houston, Portable Rig Co., Inc. Utah: Salt Lake City, Lund Mach. Co. Virginia: Richmond, Standard Parts Corp. Washington: Seattle, Berg Evans Chain Co.

four deep well pumps set outside these buildings, providing an aggregate flow of 1,000 gal. per minute at 52 deg. The air is blown through water sprays in each of these structures and is distributed through the building via 3,000 lineal ft. of ducts which range from a size of 68 x 90 in. at the fans to 26 x 20 in. at the outlets farthest from the fan units. The ducts are made of copper bearing steel which varies in gauge from No. 16 to No. 20, depending upon the

cross-section diameters.

All used air is exhausted through 42 ventilating hoods in the roof above furnaces and other equipment generating heat, where aprons extending from the ceiling to the bottom chord of roof trusses trap heat at the outset. The air moves into the plant at the wet bulb temperature and it is estimated that the extremely rapid exhaustion of air through the roof above these units will maintain highly satisfactory conditions.

Hannifin Finger-Tip Pressure Control Bulletin No. 47. A finger-tip pressure control for use on Hannifin Hydraulic Presses for straightening, forcing, press-assembly, and similar operations is discussed in a four-page bulletin now being distributed by the Hannifin Mfg. Co., 621-631 S. Kolmar Ave., Chicago, Ill. Application of the control to a Hannifin Hydraulic Straightening Press is illustrated and described in detail. Copy free upon request.

"Geometric Style CT Taper Die Heads" for use in hand screw machines, turret lathes, and other similar equipment is the subject of an eight-page bulletin now being issued by The Geometric Tool Co., New Haven, Conn. Features of the Style CT Taper Die Head as well as instructions for setting up and operating are contained in the bulletin. Illustrations, specifications, and tables are also included. Copy free upon request.

Coated Abrasive Papers and Cloths. The sixth edition of a general catalog and price list covering abrasive papers and cloths has been issued by Abrasive Products, Inc., 507 Pearl St., South Braintree, Mass. The various brands of abrasives manufactured by this firm are described, and specifications for paper in rolls and sheets, cloth in rolls, cloth and combination in sheets, cloth and combination belts, paper belt, paper in discs, and so on, are given.

The publication also includes illustrations showing the machines and operations required in the manufacture of abrasive cloth and paper. The latter part is devoted to tables listing the standard goods manufactured by Abrasive Products, Inc. Copy free.

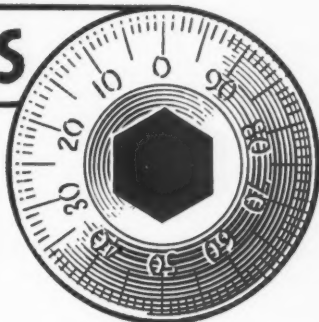
"Superrench" and "Supersocket" Wrenches and Tools. In this booklet, containing 60 pages, J. H. Williams & Co., 260 Lafayette St., New York, N. Y., presents the complete line of "Superrench" and "Supersocket" wrenches and tools made by this firm. The line includes engineers', obstruction, construction, structural, 12-point box, hex-box, open end, general service, tappet, and adjustable hook spanner wrenches, midget, bantam, standard, heavy duty, and extra heavy duty pattern sockets, automotive screw drivers, pliers, punches, and chisels, and various "Superrench" and "Supersocket" sets. Tables giving sizes and dimensions are included. Copy free upon request.

"Victor's Bargains in New Small Tools." The 1939-1940 edition of a general catalog, entitled "Victor's Bargains in New Small Tools," covering the line of products marketed by the Victor Machinery Exchange, Inc., 251 Centre St., New York, N. Y., has been announced by this firm. The line includes arbors, die sets, belting, belt hooks and dressing, bench plates, chucks, counter-bores, cutters, demagnetizers, dies, dividing heads, dowel pins, drill presses, drill rod, emery cloth, emery wheel dressers, end mills, files, gages, hack saw blades, knurling tools, lathe centers, mandrels, micrometers, power saws, protractors, reamers, saws, springs, taps, twist drills, vises, wrenches, and so on.

To prevent delay in seeking information, the catalog is provided with a general index covering each type of article listed therein and, in addition, contains illustrations throughout. Copy free to shop executives upon request.

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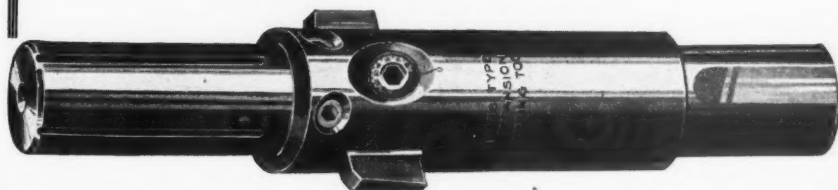
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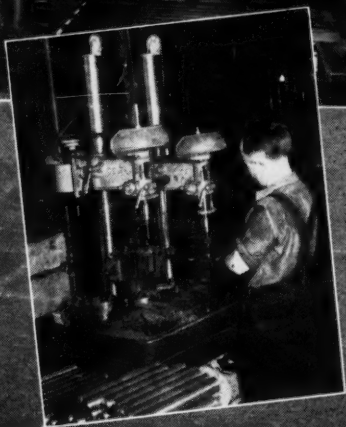
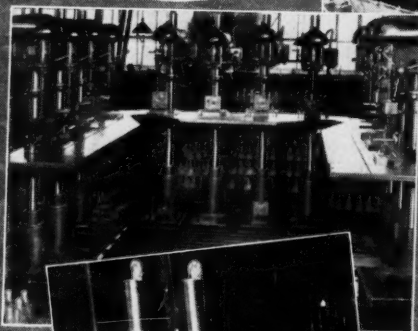
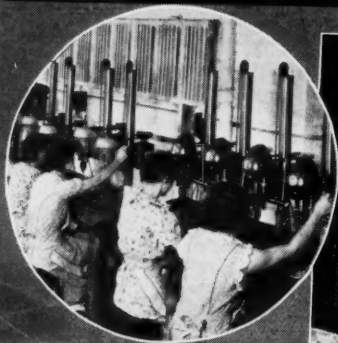
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Law of Machine Shop Service Contracts

By LEO T. PARKER
Attorney at Law, Cincinnati, Ohio

FREQUENTLY a buyer or seller of machine tools or other equipment will find himself involved in a legal controversy based upon a contract of sale which contains a clause in which the seller agrees to render service on the tool or equipment for a stipulated period of time. Generally speaking, contracts of this nature are valid and enforceable by the purchaser, providing he fulfills the obligations assumed under the contract.

In other words, a seller of machine tools always is obligated to perform service on his product in strict accordance with the terms of the contract, providing the purchaser fulfills his agreement. However, failure of the purchaser to fulfill his agreement places the seller in an advantageous position. The law gives him the privilege and opportunity of deciding upon the next step or procedure.

Various courts have held that if a purchaser breaches or violates a contract of sale in any manner, as where he fails to make payments on dates specified in the contract, or fails to accept delivery, as agreed, or fails to use the machine in the manner prescribed in the contract, or the like, the seller may do any of these things: (1) he may refuse to continue to perform his obligations of the contract and sue the purchaser for damages and profits equal

to his financial loss resulting from the breach; (2) he may file suit and compel the purchaser to fulfill the exact terms of the agreement; (3) or the parties may enter into negotiations and make a supplementary contract.

Now, while we are in this phase of the law, it should be realized that the courts consistently hold that a purchaser is always privileged to cancel a contract where a seller (1) fails to make delivery of merchandise on the date specified in the contract, whether such contract is verbal or in writing; (2) fails to make delivery in the manner specified by the purchaser; or (3) where the seller fails in any other particular details to fulfill the assumed obligations, as installation, service or the like.

Purchaser Difficult to Satisfy

After a machine tool has been accepted and put into operation by the purchaser, the seller is bound by any and all reasonable provisions relating to the service which the seller has promised to give. However, the courts will not permit any purchaser to impose on a seller, unless an imposition is clearly expressed in the contract.

For illustration, in one case a contract of sale "guarantees that the purchaser shall be satisfied." Although the tool was reasonably good and worth the purchase price, the

purchaser continually and at unreasonable frequency requested the seller to supply an unnecessary amount of service in adjusting, repairing and otherwise performing work on the tool.

At last the seller refused to give more service. Then, the purchaser notified the seller that he was not satisfied. Since, by the contract, the seller had guaranteed satisfaction, the purchaser demanded that the seller take back the machine tool and refund the amount paid. He notified the seller that he would not pay other payments due on the tool. The seller filed suit and proved that the machine had given reasonably good service, notwithstanding the complaints registered by the purchaser. In view of this testimony, the higher court held the purchaser bound to pay the balance due on the tool.

On the other hand, if a contract of sale clearly and distinctly specifies the kind of service, on what dates inspections, alterations, adjustments and necessary repairs shall be made by the purchaser, then the latter positively is obligated to fulfill the exact terms of this contract. Failure of the seller to do so is a legal breach which entitles the purchaser to rescind the contract, demand the seller to take back the machine tool and return the purchase price.

Payments Delayed

The courts have held that under an installment payment lease or sale contract a purchaser may be compelled to pay the full amount due if he fails to make one or more installment payments required in the contract. However, this rule of the law is not applicable with respect to machine tools which are sold or leased under contracts by the terms of which the seller agrees to keep

the tool in operating order for a specified period, or agrees to render services, and fails to do so.

Moreover, the fact that a contract of this nature provides that the seller shall service the tool at times when he believes the service is required means that actually service must be rendered when it is *required* whether or not the seller believes that service is necessary.

For example, in the leading case of *Sinn 30 P. (2d) 761*, it was disclosed that a seller entered into a written agreement whereby it agreed to lease to a purchaser certain equipment for a stipulated rental, to be paid in weekly installments. The contract contained the following clause: "In the event of default in the payment of any installment of this note, the holder (seller) thereof may at its option declare the remaining installments not then due hereunder *immediately due and payable*."

The contract also provided that the seller would from time to time inspect the equipment and supervise such repairs and adjustments as may *in his opinion be necessary* for its operation and maintenance. Also, any breach of the contract upon the part of the purchaser made him liable for the balance due under the contract, and for any and all damages sustained by the seller by reason thereof.

After the purchaser had made several weekly payments, he defaulted in making further payments on the contention that the seller had not rendered service when actually it was necessary. However, the seller repossessed the equipment, and immediately thereafter filed suit to collect the entire balance on the contract price.

In view of the fact that this contract contained the above mentioned service clause by which the seller

agreed to keep the equipment in operating order, and the testimony indicated that the seller had not rendered service when it was reasonably necessary, the higher court held the purchaser not required to pay the balance due on the original rental contract, and said:

"In the instant case the agreement to make the weekly payments was based upon consideration of the use of the equipment and the service which plaintiff (seller) was to render in keeping the equipment in operating order. . . . When plaintiff repossessed the equipment it was not entitled to the unpaid balance, for it was not in a position to allege or prove performance upon its part."

Now, if this had been a sale contract, instead of a rental contract, the higher court would have required the seller to take back the machine and the seller would have been liable in damages to the purchaser for failure to render the agreed services. But since it was a rental contract and the purchaser had used the machine and had received value for the rentals which were paid, the court merely declared the contract to be at an end and held the purchaser or user not bound to pay other rentals specified in the contract, although the user had breached the contract by his failure to pay rentals when due.

Purchaser Breaches Valid Contract

In all legal controversies involving contracts for sale of machine tools, one of the important legal questions to be decided by the court is: Did either the buyer or seller fail to fulfill his obligations assumed in the contract?

While a seller is liable for his failure to perform service in accordance with the terms of the contract, failure of a purchaser to keep a machine in proper adjustment, if it is required

in the contract, also is a breach on the part of the purchaser which renders the latter liable.

For illustration, in *Carisch*, 255 N. W. 814, it was shown that a purchaser purchased a machine and paid \$500 down. He was to pay the balance in 24 monthly installments. In addition to this sum, the purchaser was to pay a stipulated amount for service and inspection to be supplied by the seller. The contract stated that the seller was to supply and install the equipment and supervise its repair and adjustment so far as, in his opinion, "it was necessary for the satisfactory operation and maintenance of the equipment."

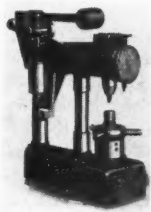
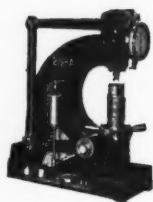
Also, the contract provided that the purchaser agreed to keep on hand necessary repair parts and bound himself to keep the equipment in good and efficient working order and condition and to maintain and operate it as prescribed by the seller. If a defect or faulty adjustment developed which could not be immediately corrected by the purchaser he was bound to communicate promptly with the seller and to refrain from using the machine until it was properly adjusted.

Another clause in the contract provided that if the purchaser defaulted or breached the agreement the seller was entitled to collect the entire balance due on the contract price.

Without going into details as to the connection of the equipment, the evidence tended to show that the equipment got out of adjustment and failed to operate satisfactorily. The purchaser failed to make the agreed payments and the seller filed suit. In holding the seller entitled to recover the entire balance due because the purchaser failed to notify the seller when the machine got out of order, the court said:

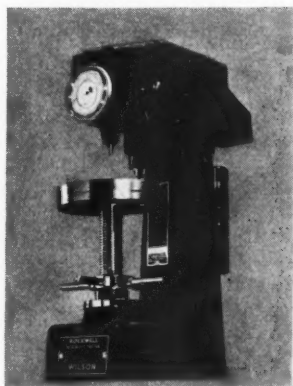
"The defendant (purchaser) him-

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MODERN MACHINE SHOP

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self satisfied that the machine operated all right for some time after being serviced. He had in his employ operatives who claimed to be experts with such machines and who testified as such upon the trial. At any rate, he (purchaser) contracted to keep the equipment in good and efficient working order and condition, and it is conclusively shown that when in adjustment it operated satisfactorily."

Rights of Purchaser

If a seller of a machine tool fails to conform with and abide by reasonable and valid obligations to render service, the purchaser may rescind the contract, demand the seller to take back the machine and demand a refund of the amount paid on the purchase price. This same rule of the law is applicable if the testimony shows that the seller knew the purposes for which the purchaser intended to use the machine tool at the time the contract was made, and the tool would not perform the work.

For example, in *J. v. Cox*, 178 S. E. 585, it was disclosed that a buyer purchased a machine for \$900 under a conditional sales contract which specified that \$600 was to be paid cash on delivery, and the balance of the purchase money amounting to \$300 was to be paid in three months. The conditional sales contract contained the following warranty: "The seller warrants each product to be well made, of good material, durable with good care, and, if properly set up, adjusted and operated by competent persons, to be capable, under ordinary conditions of doing the work for which it is designed."

The purchaser failed to pay the balance due alleging that when the machine was delivered to him, at his plant, it was defective, wasteful in operation, and was not capable under ordinary conditions of "doing the

work for which it is designed." The seller filed suit to recover the \$300 due and the purchaser sued the seller to recover the \$600 paid on delivery of the machine.

During the trial the purchaser proved that the machine was out of balance and did not run true.

It is interesting to know that the higher court held the purchaser entitled to recover back from the seller the \$600 paid, and held that the purchaser was not bound to pay the \$300 note.

Frequently, after a contract of sale is completed and the purchaser signs and delivers notes in payment for the machine tool, the manufacturer or seller disposes of the notes to a finance company. In many instances, the finance company is not fully informed as to verbal agreements, and in some instances it is not informed by either the buyer or seller as to service agreements made by the seller and which, of course, are an important part of the contract as between the buyer and seller. However, the service agreement always should be incorporated in the contract of sale, which is attached to or connected with, or has reference to the notes. Otherwise the finance company is considered an innocent holder of the notes. Under these circumstances although the seller fails to fulfill the terms of the service agreement, the finance company may sue the purchaser and recover on the notes.

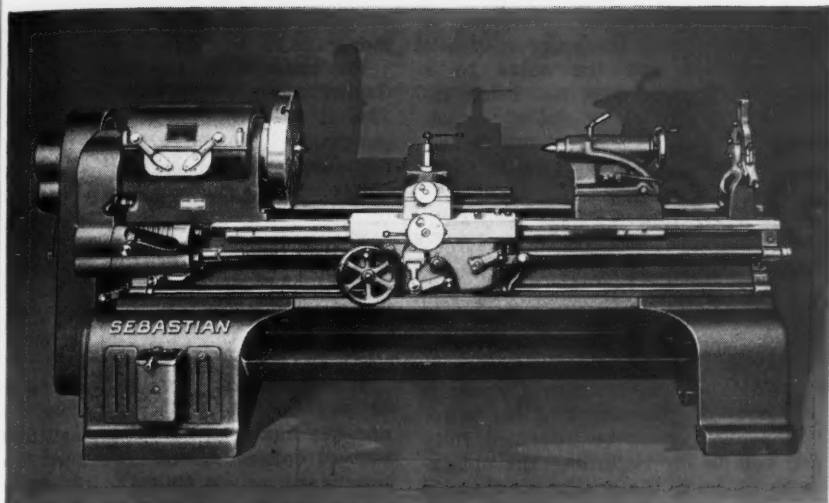
It is important for all buyers and sellers of machine tools and other merchandise to realize that where a seller takes a contract from a buyer who gives his notes in payment for the subject of the contract, it is necessary that all verbal and written agreements between the buyer and the seller shall be incorporated in contract of sale to which the notes are directly connected by proper and ade-

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quate description and reference. If this is not done, the seller may sell the contract and the notes to a finance company who, not being informed of special or "side" agreements between the buyer and seller, cannot be expected to agree to these unknown provisions and favor the buyer as probably would the seller.

No person or firm who purchases a negotiable note is required by the law to interview the maker of the note and make inquiry as to the obligations not expressed in the note or connected document. The law expects the maker to provide means whereby any and all purchasers of his negotiable notes shall be informed fully and completely regarding the obligations of both the maker and payee of the notes.

For illustration, in *Andrews, 222 N. W. 340*, it was disclosed that a person gave his note on a contract without connecting the contract to the note or otherwise causing the note to refer to the contract. Although the terms of the contract were not fulfilled, the maker of the note was held bound to pay its amount to the company which had purchased the note from the original holder.

Holder Has Information

On the other hand, it is well settled that any person who accepts a note knowing details of the agreement between a buyer and seller is bound to the same extent as the original holder or maker. Therefore, a person who takes a promissory note from the payee or holder is bound by all agreements of which he has expressed or implied knowledge between the original maker and the payee. Also, if a holder of a mortgage and notes assigns or sells both, the purchaser of such mortgage and notes is deemed to have knowledge of the

contents or special provisions in the mortgage.

For example, in the recent case of *Carius v. Ohio Company, 164 N. E. 234*, it was disclosed that a buyer purchased a machine tool, giving in payment several promissory notes for \$50 each. The notes were secured by a mortgage.

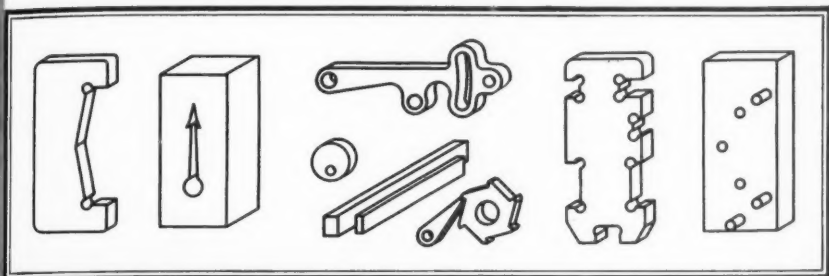
Soon afterward the seller of the tool sold the notes and the mortgage to a financing company and endorsed the same "For value received, I, we hereby assign this note and the mortgage securing it to....."

It seemed that the purchaser failed to pay one of the notes when due and the financing company instituted suit to collect the balance due. The purchaser proved that the reason he failed to pay the note was that the tool failed to render service equal to the guarantee issued by the manufacturer when the contract of sale of the mortgage, and the notes were signed.

The financing company contended that since it had purchased the notes as a bona fide holder, the purchase of the equipment was bound to pay the notes, irrespective of the guarantee between the manufacturer and the dealer, particularly since the financing company was not expressly informed of the existence of this guarantee. However, the court held the financing company impliedly informed of the contract between the buyer and the seller and, therefore, not entitled to collect the money on the notes and mortgage, saying:

"We therefore have come to the conclusion that in the instant case the writing upon the back of these notes was an assignment, and it not only assigned the note, *but assigned the mortgage*; and there were other circumstances here that would put the purchaser (financing company) upon its guard, for it knew *where these notes were given for.*"

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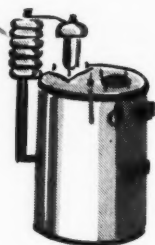
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Lightning---

the Newest Production Tool



By ROY A. GAVERT

WHEN Benjamin Franklin tied a key to a kite-string to find out whether the lightning that flashed between the clouds was the same electricity that was confined in his Leyden jar, little did he dream that the time would come when men would not only throw million-and-a-half-volt lightning bolts at will, but would use this lightning as a test tool in factory production. Yet it is being done every day in the Westinghouse Electric & Manufacturing Company's transformer factory at Sharon, Pa.

Heretofore considered a tool of the laboratory, to be used under the sole direction of laboratory technicians, a lightning generator has been added to the modern roller production line for the purpose of testing the transformers made in this plant. This addition has been made without interrupting the production line operations and with absolute safety to the factory personnel, although the generator produces test voltages rising at a rate of one and a half million volts in a millionth of a second and currents of 55,000 amperes.

The equipment was developed as an aid in devising a distribution

transformer capable of withstanding the abuses of lightning and also to provide a method of proving that each transformer which leaves the factory is actually lightning proof.

Preparation for the lightning "surge" test includes a loop in the production line just past the point where the transformers receive their final vacuum-furnace treatment and just before they pass to the department where they receive the conventional electrical tests. It is essential to give the transformers the lightning test after all assembly work has been completed so as to serve as a check on all the elements and their co-ordination.

All distribution transformers on this production line, which includes all those of the completely self-protected class as well as many of the so-called conventional class which do not have all of the surge protection features, emerge at one end of a battery of three drying ovens on gravity, knee-high roller conveyors. Here they are moved onto sections of roller conveyors on wheels, called

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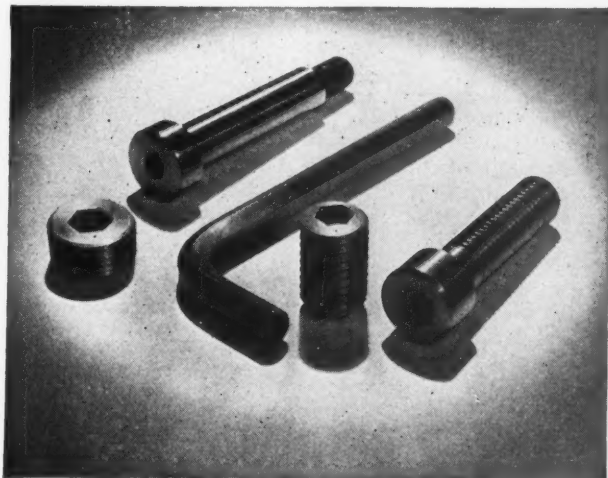
THE HOL
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H O L O - K R O M E

transfer tables, which move on a track across the exit face of the furnace and discharge their loads onto the gravity conveyors which make the loop through the surge test room.

Continuing on roller conveyors out of the test department, the transformers pass to the final paint division or can be diverted onto a conveyor for a return trip through the surge test room if desirable. This provides a flexible arrangement by which the production line flow is uninterrupted even if it is necessary to give an occasional transformer a second surge test after it has passed through the conventional electrical tests.

The transformers are brought into the surge test room on transfer trucks and are pushed off onto a roller conveyor which makes a complete loop around the walls of the surge test room. The surge generator itself occupies the center of the room, with the two test booths and control bench at the far end of the room.

Two men, ordinarily, are required to make the tests, one being the operator of the control desk and the other a helper who manipulates the transformers into and out of the two test booths.

To prepare for the test, the workman slides a transformer from the feeder roller conveyor onto a special truck which fits into a gap in the conveyor in front of the test booth and the truck is then rolled on its own track into the test booth. At the back of the truck is a vertical panel with short cables terminating in special C-type clamps for making quick connections to the transformer terminals. The back of the panel has prong-type contacts so that when the test truck

is pushed along its track into the test booth connections are automatically made to the surge generator. With a transformer in place, the workman moves away from the booth and steps on a switch which makes it possible for test operator to proceed.

The only action required of the test operator is to initiate the action



Fig. 1 — Man-made lightning stroke of 1,500,000 volts produced by the new Westinghouse surge generator striking completely self-protected distribution transformer on the testing line. Despite the blast of lightning, the transformer is unharmed due to the fact that de-ion gaps detour the stroke to the ground.

and, if necessary, make any slight adjustment of power supply voltage. He turns a miniature switch and the remaining sequence of events is automatic, although the operator can interrupt the test at any instant. On moving the miniature switch, a thick door is automatically lowered by a

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action

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ceiling-type hoist across the front of the test booths and the lightning generator begins to charge.

In about seven seconds the voltage and current have been built up sufficiently and the charge is applied to one of the transformer terminals. Opening a 55,000 ampere discharge makes a deafening report similar to

former is moved again onto the roller conveyor and taken back to the production aisle where the standard A.E.E. electrical tests are applied.

Equipment for making the surge test includes two complete independent test booths and two identical test trucks. While a transformer is being tested in one booth, the work-

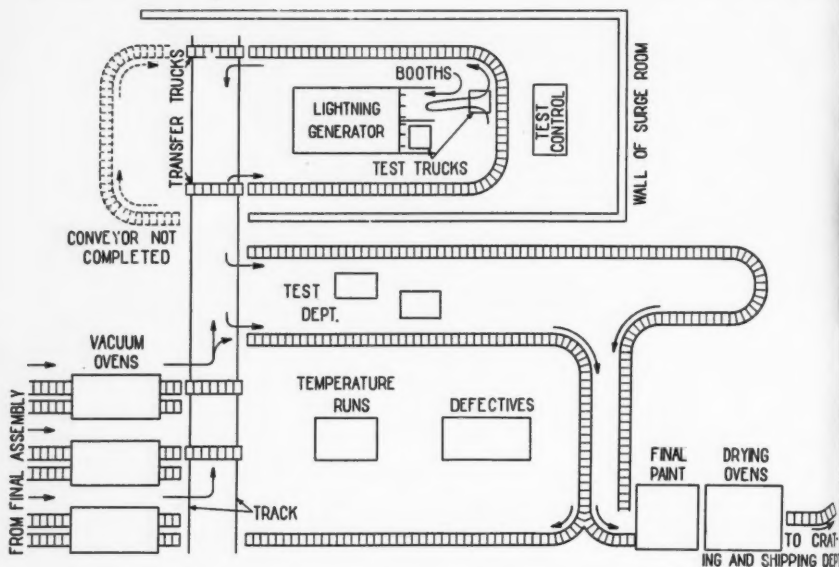


Fig. 2—Layout showing location of surge test in production line.

that of a nearby lightning stroke, which, indeed, it is. An automatic switch behind the test booth connects the surge generator to the next terminal to be surged and the test is repeated until all terminals have been tested.

The door then is hoisted automatically and the workman pulls the truck from the booth so that he can make a visual inspection of the transformer for any evidence of distress as the result of the test, such as bubbles in the oil, cracked porcelain and so on. Passing this, the trans-

man inspects the last transformer tested and prepares a transformer for the second truck for test. Thus when the test on one unit is completed and the door is lifted, the workman pushes a test truck into the second booth and withdraws the one from the first booth, permitting the test to proceed immediately. In this manner the surge generator is kept in almost continuous service, without being delayed for the making of connections or for inspection work.

In each test booth is a mirror placed at an angle so that the test

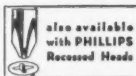
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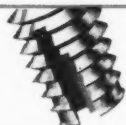
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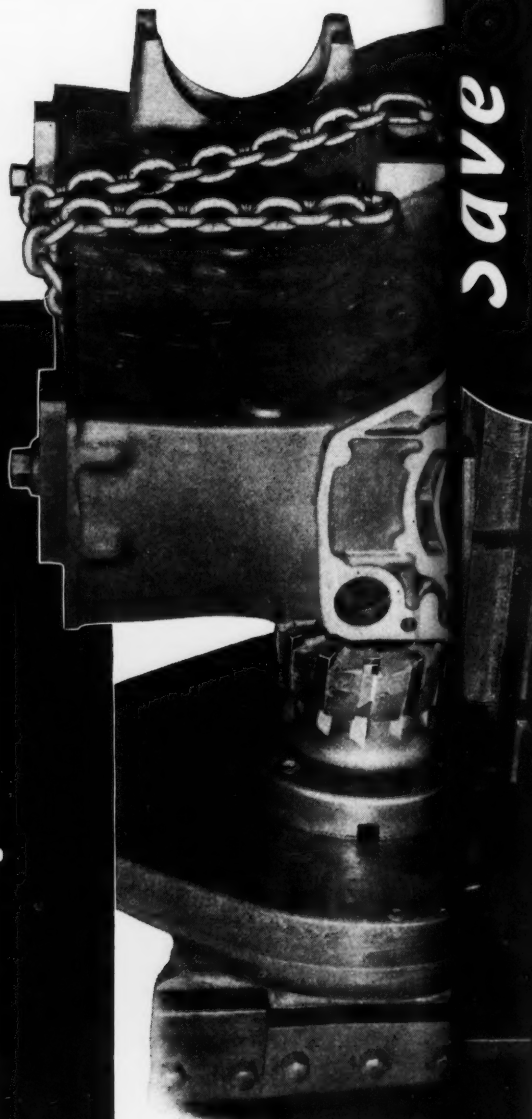
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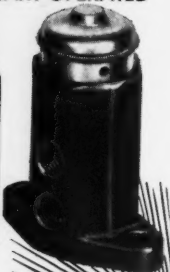
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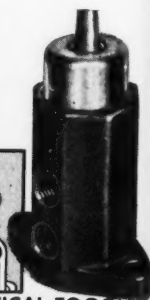
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operator can look through a window in the booth door down onto the transformer. He thus can watch each "shot" as fired and observe any abnormal reaction of the transformer to any of the tests.

Precautions to ensure the safety of the operators are quite complete. A combination of interlocks virtually eliminates hazards. Should anyone attempt to enter the surge test room from outside while a test is in operation, a switch on the door (which is several steps away from the fence surrounding the generator) causes the surge generator to be instantly de-energized and grounded. A steel fence separates the surge generator and test area from the transformer transfer area. The gate in this fence also has a switch that de-energizes the entire test equipment when it is opened.

When the workman has placed a unit in the test booth he must step back to a foot switch several feet away before the test operator can lower the door of the booth. This ensures that no part of the workman can be struck by the downcoming door. Also, a magnetically-operated plunger projects across the door grid and can be withdrawn by the test operator only when he and the workman are in their respective safe positions, ensuring safety in case of failure of the hoisting equipment.

The test operator also has a foot switch so placed that he can operate the controls from only one position; namely, from behind the desk, facing the test booth, with all controls within reach.

The power supply for the surge generator is taken from transformers in a small enclosure beside the test operator. Opening the gate to this

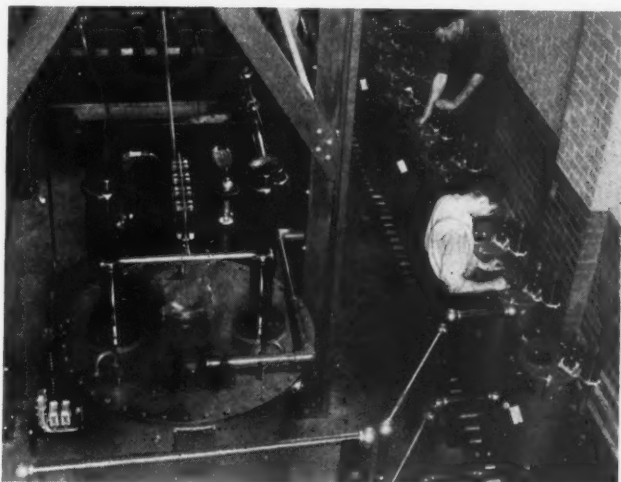


Fig. 3—Line of distribution transformers moving on conveyor from manufacturing department to lightning surge test chamber. At left is end view of new lightning machine for putting Jupiter's bolts to work.

enclosure opens a switch that removes potential from all apparatus. No potential hazards at any time appear on the control bench. The maximum voltage is the 220-volt autotransformer and that is thoroughly insulated from any part that can be touched.

To make the recurring report tolerable by the test crew, the four walls, ceiling, and door each consist of two layers of 1½-inch pressed cork with a 1½-inch thick wall of maple between, which muffles the sound.

Machine Tool Show Announced for 1939

Place---Cleveland. Time---October 4th to 13th.

A 1939 Machine Tool Show, to be held in Cleveland, October 4th to 13th, has been announced by the National Machine Tool Builders Association. Both in number and range of exhibits and in improvements in performance and design of machine tools, this year's Show is expected far to surpass the Machine Tool Show which was held in Cleveland in 1935.

The Show will be housed in Cleveland's \$15,000,000 Public Auditorium, which contains over six acres of exhibition floors. Of this space, 150,000 square feet will be occupied by the booths of exhibitors, ranging in size from 200 to 4,000 square feet.

Eighty-five per cent of the exhibit space will be devoted exclusively to the showing of machine tools. The balance will contain displays of makers of machine tool accessories and of publishers of magazines covering the machine tool field.

Remarkable interest in this year's Show is evidenced by the fact that all of the available exhibit space has for some weeks been oversubscribed, and original requests for exhibit space had to be cut in order to hold the total allotted booth space within

available limits.

The number of machines exhibited will run into the thousands, and their value into the millions. To provide the power required to operate the machines upon the exhibit floor, special power lines will be installed carrying an 8,500 horsepower connected load.

Manufacturers from all over the United States and from many foreign countries are expected to visit the Show. Admission will be by registration, with a registration fee of \$1.00.

"The purpose of the Show is to place under one roof, for convenient inspection and study, the finest and most modern machine tool equipment from every branch of the machine tool industry," says Wendell E. Whipp, president of the National Machine Tool Builders Association and president of the Monarch Machine Tool Co., Sidney, Ohio.

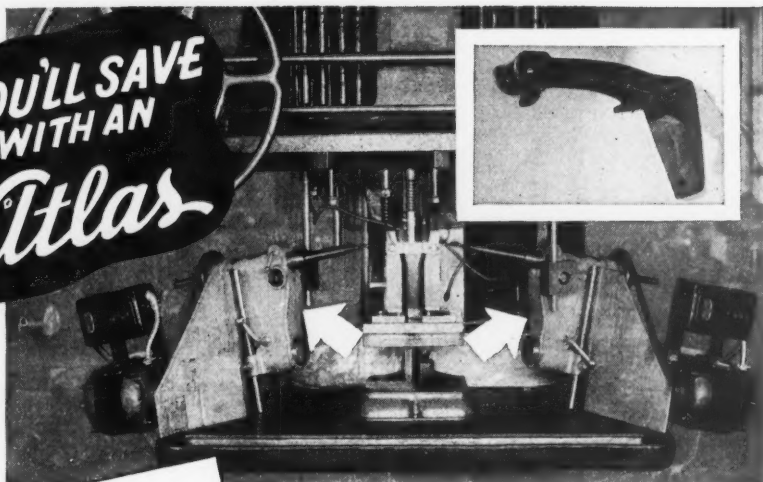
"The last four years have shown substantial advances in the art of machine tool building—advances which mean reduced production costs, increased productivity per dollar invested, and greater potential profits."

"The visiting manufacturer will



Wendell E. Whipp, President of The National Machine Tool Builders Association, and President of The Monarch Machine Tool Co. of Sidney, Ohio.

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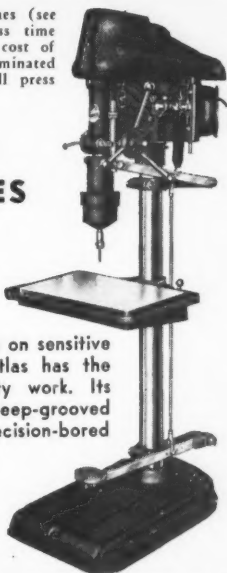
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Five holes—two at different planes (see
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with this unusual set-up. The cost of
a special drilling machine was eliminated
by simply using two Atlas drill press
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Scenes like this from the 1935 Machine Tool Show will be duplicated many times over when thousands of executives from every branch of the metal working industries flock to Cleveland in October for the 1939 exhibit. Machines will take six-and-one-half acres of display space which is every available square foot of Cleveland's mammoth Public Auditorium.

have ample opportunity to watch various machines in operation, to ask questions, and to determine just what tools will be most effective in solving his particular production problems.

"This year's Show is purely a business proposition. Registration fee is charged mainly to insure that attendance will be confined to people who have a direct dollars-and-cents interest in better machine tool equipment. Rules governing displays have been worked out with a view toward maximum visibility and a minimum of crowding."

In connection with the Machine Tool Show will be held a series of

evening meetings sponsored by the Machine Tool Congress, open to the people attending the Show. Organizations participating in the Machine Tool Congress will include the American Foundrymen's Association, International American Society of Mechanical Engineers, American Society of Tool Engineers, Associated Machine Tool Dealers, Cleveland Engineering Society, National Electrical Manufacturers Association, National Foremen Association, National Machine Tool Builders Association, and Society of Automotive Engineers. Speakers at these meetings will include outstanding industrialists and engineers.

Rockford 36-In. Hy-Draulic Openside Shaper is the subject of a six-page folder issued by the Rockford Machine Tool Co., Rockford, Ill. The folder discusses openside construction and mechanical versus hydraulic drives, as well as features and advantages of Hy-Draulic Shaper design. Illustrations of the 36-In. Hy-Draulic Openside Shaper and several of its accessories, together with a complete table of specifications, are included in the folder, copy of which will be sent free upon request.

Fellows Involute Measuring Machine The Fellows Gear Shaper Co., 78 River St., Springfield, Vt., is now publishing a four-page bulletin illustrating and describing its involute measuring machine for checking gear tooth shape. The bulletin includes illustrations and a description of the setting and adjusting of the involute pointer of the machine relative to work. The use of the involute machine in checking steps and cluster gears is also illustrated. Copy free upon request.



DEVELOPED for industrial users requiring a shorter, lighter, yet ruggedly built $\frac{1}{2}$ " drill for general-purpose machine shop operations, this brand-new Van Dorn $\frac{1}{2}$ " Utility Drill is an amazing engineering achievement at a new low price!

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With its minimum spindle offset, ball-bearing mountings and convenient horizontal spade handle, this versatile drill permits more jobs with one tool—in open space and close space—and that means faster, easier work!

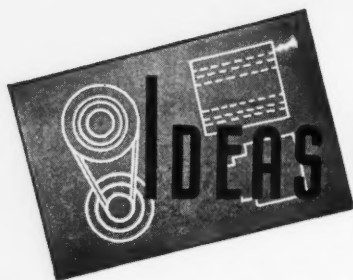
Your Van Dorn Jobber will be glad to demonstrate this new $\frac{1}{2}$ " Utility Drill. Or write to us for details. Van Dorn Electric Tools (Division of Black & Decker Mfg. Co.), 720 Joppa Road, Towson, Md.



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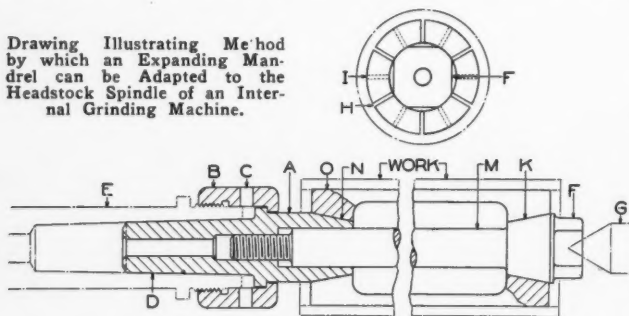
IDEAS FROM READERS

Excellent Design for Expansion Mandrel

By J. R. WHITTLES

THE drawing illustrates the design of an expansion mandrel which can be adapted to the headstock spin-

Drawing Illustrating Method by which an Expanding Mandrel can be Adapted to the Headstock Spindle of an Internal Grinding Machine.



dle of an internal grinding machine or other similar machine. In place of the usual machine center, a special center, indicated at **A**, is substituted. The center is made with two tapers, **D** and **N**, taper **D** corresponding to the taper on the regular center and consequently fits the spindle **E** while taper **N** is used to expand the sleeve **O**.

Part **M** is a $1\frac{1}{4}$ -in. steel arbor made with a taper **K** to correspond to the taper **N**. The arbor is threaded to fit the center **A**, making it possible to expand or reduce the sleeve **O**

by threading the arbor into or out of the center. Four flats milled on the end **F** provide for a wrench so that the arbor can be revolved. The end **F** is centered to receive the tailstock center.

To aid in holding the center **A** firmly in the headstock spindle, the center is made with a flange collar and a nut, **B** is threaded onto the spindle nose. The nut engages the collar, as shown, and has four holes drilled in it at equidistant points so that a rod can be inserted to tighten the nut.

Six slots are milled in each end of the sleeve **O**, as shown at **H** and **I**, so that the sleeve can expand as the nut part **F** is threaded into the spindle. Parts **A**, **D**, and **K** are hardened and ground.

Handy Wedge Leveling Block

By CHAS. H. WILLEY

ILLUSTRATED in the drawing is a wedge leveling block of simple design for use on the planer, miller, and other machines around the shop. The

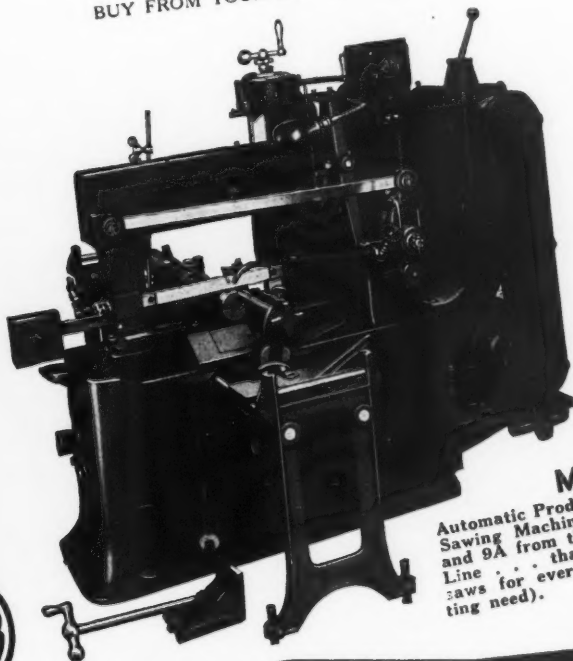
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Automatic in fact, requiring no more attention than an automatic screw machine, the new MARVEL 6A and 9A Production Saws will feed to length and cut-off from solid bar steels (to make gear blanks, for example) 10 pieces 6" round or 160 pieces 1½" round (or other bar sizes to 10" x 10" proportionately) every hour floor-to-floor—AUTOMATICALLY!

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Write for Bulletin 600
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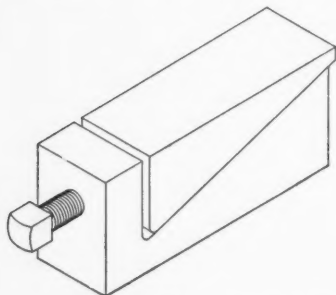
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Automatic Production Hack
Sawing Machines (No. 6A
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ting need).



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leveling device consists merely of a carbon steel base with an inclining slide upon which rides a carbon steel wedge. One end of the base is drilled



Drawing of Handy Wedge Leveling Block

and tapped to receive a hardened steel setscrew, as shown.

To use, the device is slipped beneath the machine base at the point which is to be raised for leveling. The setscrew is then threaded forward against the end of the sliding wedge. As the end of the screw contacts the wedge, the wedge is forced along the inclining slide of the base and is thus raised against the base of the machine. The setscrew can then be turned until the base of the machine is level. To ensure maximum life, the sliding wedge should be hardened.

Separable Plunger Simplifies Pump Maintenance

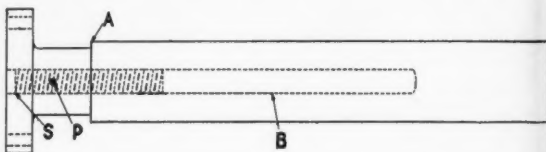
By CHARLES C. LYNDE

A check-up of oil field pump stations revealed that many duplex plunger pumps of the outside packed type were being run long past the point where plunger wear indicated

the need for truing or regrinding of the plungers. A lack of attention to having the plungers refitted was not due to slipshod operation but, instead, to the fact that the pump design was such that a major tear-down was necessary before a plunger could be taken out.

For the crosshead end of the pump, it was necessary to dismantle the crosshead, the rod at both ends, and to free the crosshead from the yoke or tie-rods which transmit power to the tail plunger. This was a job requiring considerable shut-down time and careful realignment in order to secure proper fit of the crosshead, tail slide, and plunger.

Upon a suggestion whereby the necessity of extensive dismantling might be eliminated, a plunger was carefully centered in a lathe, and the cored bore, which is provided to take care of shrinkage within the plunger, was bored out and carefully threaded for a distance of approximately 3 in. from the flange face. The plunger was then cut through at the end



Drawing showing separable plunger for oil field pump. A—Point Where Cut. B—Shrinkage Bore. P—Locking Pin. S—Threaded Connecting Shaft.

of the neck section, as shown in the drawing A, and a section of shafting of the proper diameter was threaded into the flanged end. To prevent counter rotation, the shaft was fastened with a heavy pin to the neck section of the plunger. The other end of the plunger was then bucked up, or riveted, on the protruding threaded end of the shaft, thus providing a solid plunger.

A NEW CATALOG

No. 18



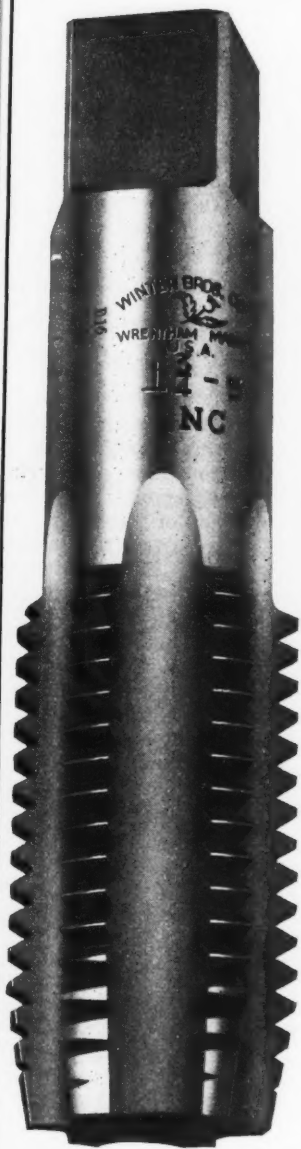
A catalog and handbook of valuable information and Tables; designed to simplify the selection of the *right* TAP or DIE for any threading job. Sent FREE if requested on company letterhead.

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Detroit, Michigan



To assemble the separable plunger in the pump, the crosshead was backed to the full extent of its travel and the smooth cylinder of the plunger was slipped into the pump barrel. The flange and cylinder of the plunger were then screwed together, and the flange was fitted onto the four studs provided for its fastening in the crosshead casting.

The separable plunger met with such prompt acceptance when shown to the managements of various pipeline companies operating in the repair shop's territories that during the first month some 42 plungers were worked over. The shop now makes, on order, plungers of any specified diameter with the flange ends worked over in advance. With plungers of this type, in order to change the cylindrical portion—the sole part undergoing wear in operation—it is only necessary to break

the set of the thread with a pair of cushioned or padded tongs or a chain wrench, slip off the flanged end to provide clearance for withdrawing the plunger from the barrel, and insert a new cylinder.

The development of the separable plunger has provided the means for obtaining an additional number of dressing jobs and has also enabled many pipeline stations to treble the packing life of their pumps.

Lighting System on Tracks Solves Illumination Problem

By A. W. STEINBERGER

AN eastern manufacturer was recently confronted with the problem of illuminating a production operation which consisted of aligning and inspecting assemblies comprised of a large number of parallel aluminum plates spaced a few thousandths of an inch apart. This production operation was conducted on a 20-ft. portion of each of a series of belt conveyors, several different assemblies being run on these conveyors at various times. The use of lighting fixtures containing a point source of light resulted in reflections from the closely spaced edges of the plates in the assembly, thus dazzling the operator and making it difficult for him to center the plates in relation to each other.

Tests made with various colored lights and filters, high and low intensity mercury vapor lamps, and so on, proved that changing the part of the spectrum covered by the light source had no effect in reducing the glare and reflection from the work. As long as illumination was emitted from a point or localized source, dazzling reflections were present.

Obviously, the solution to the problem consisted in illuminating the work area indirectly with light of

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the **RIVITOR**—for automatically feeding and setting solid rivets, in automotive parts—clutch plates, seat racks, window frames; in cooking utensils—coffee pots, percolators, dripolators, shears, knives, can openers; in containers—oil and paint cans, garbage cans, cement pails; in sleds, skates, toys—production riveting of all kinds—obtaining a stronger joint, better—faster.



the **CLINCHOR**—for automatically feeding and setting clinch nuts in automotive body panel sections—door locks—and set as fast as the operator can feed the work to the machine. May be tooled for "D," "Case" or "Extruded" type clinch nuts. A machine—not an attachment for a punch press—increasing production from three to five times—definitely minimizing spoilage.



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Write for details to the TOMKINS-JOHNSON Co., 620 N. Mechanic Street, Jackson, Michigan, or get in touch with our representative in your territory.

Boston—General Mach. Corp. • Buffalo—R. C. Neal Co., Inc. • Chicago—H. F. Wolnick Mach. Co. • Cleveland—S. G. Morris • Denver—Edward C. Swan • Detroit—Haberkorn & Wood • Grand Rapids—Joseph Monahan • Hartford—George M. Pearse, Jr. • Indianapolis—Henry G. Hoss • Milwaukee—J. M. Grimstad • Newark—George M. Pearse • Philadelphia—W. A. Rankin (Drexel Hill) • Pittsburgh—J. A. Bouslough • Rochester—R. C. Neal Co., Inc. • San Francisco—R. W. Conroy • Syracuse—R. C. Neal Co., Inc. • Canada—Geo. T. White Co. (Walkerville, Ont.) • Europe—Gaston E. Marbaix, Ltd., London.



Illustration Showing Installation of Special Lighting Fixture on Overhead Track.

uniform intensity. Tests were conducted using various types of indirect lighting fixtures, but it was found that these fixtures emitted most of their light reflection from a relatively small area of the ceiling above and thus little improvement was noted over the types of lighting previously discussed. However, one type of fixture was found which proved to be satisfactory for the job. Fixture is shown in illustration.

The fixture consists of an inverted aluminum trough 10 ft. long, containing several lamps. Over this trough is located a curved hood with the concave under-surface finished in flat white. A number of hoods of this type are joined together to form an unbroken light-source from one

is clearly shown in the illustration. Two fixtures, with their ends abutting, are used on each conveyor.

A Milling Fixture for Fragile Work

By L. KASPER

THE drawing shows the construction of a fixture which was designed to hold the piece A for milling the groove in the upper surface. The part A is an iron casting which is finished only on the angular edges, the requirement being that the groove be milled parallel with these edges. Owing to the fragility of the work piece, it must be clamped firmly but without sufficient pressure to distort

end of the bench or conveyor to the other. The fixtures are connected by means of three long drop cords located 20 ft. apart and equipped with plugs at the ends which fit into female receptacles on the fixtures. The even distribution of the reflected light results in glareless illumination.

In order to reduce the number of special lighting fixtures required, an overhead track system was installed which permits the lights to be moved to any desired section of the conveyors; thus one set of lights can be made to serve any conveyor section. The set-up for one of the fixtures

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Tungsweld
Shears

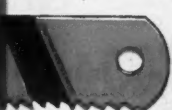


Rotary
Shears

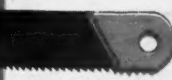
BACK SAWS



High Speed Steel—Bright



Wolfram Steel—Red



Tungsten Steel—Black



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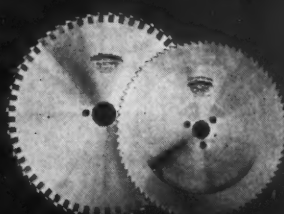
Simonds Saw and Steel Co.

Established 1832

Fitchburg, Mass.



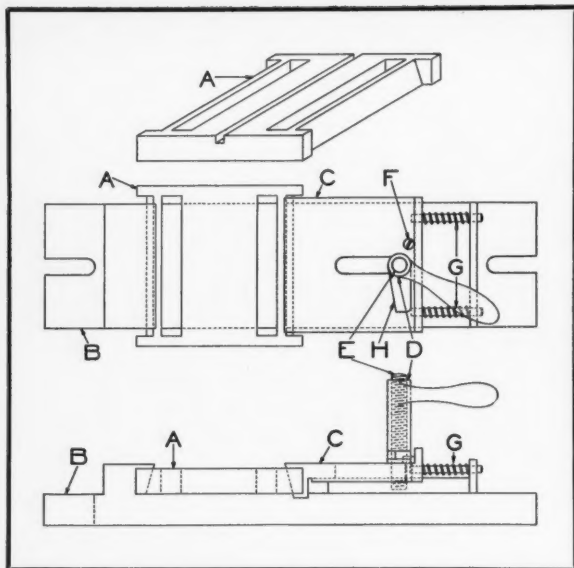
Hard Edge
Band Saws



Solid and Inserted Tooth
Circular Saws



Slitters



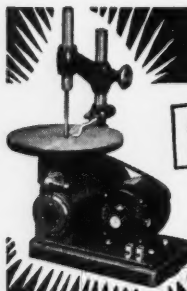
Drawing Illustrating Design of Milling Fixture for Fragile Work.

or break it.

The base plate **B** carries the sliding block **C**, which is forced toward the workpiece by two springs. The threaded stud **E** in the plate **B** carries the cam lever **D**, which is internally threaded. In the position shown, the work **A** is held between the angular surfaces of the plate **B** and the block **C**. The force exerted by the springs, however, is sufficient

lever **D** strikes the stop screw **F**, the fixture is fully opened and the work **A** may be removed.

Rockford Double-Housing Hy-Draulic Planers are illustrated and described in detail in a four-page bulletin published by the Rockford Machine Tool Co., Rockford, Ill. Advantages of hydraulic drives and features of construction are discussed. Specifications are also given. Copy free upon request.



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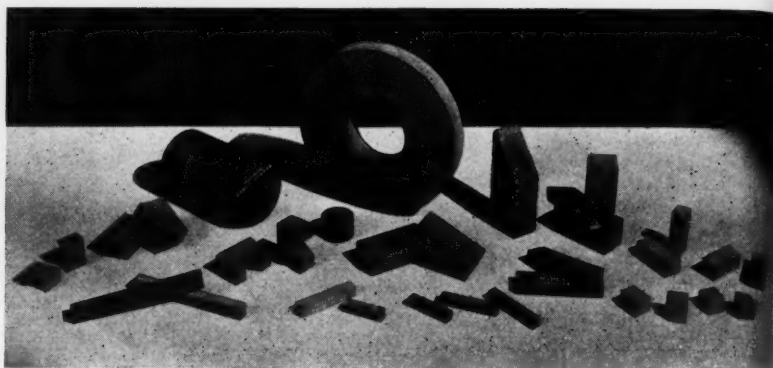
In Canada: Greenfield Tap & Die Corp. of Canada, Ltd., Galt, Ontario.

July, 1939



GREENFIELD

MODERN MACHINE SHOP 111



For Superfinishing . . .

NORTON STONES and WHEELS

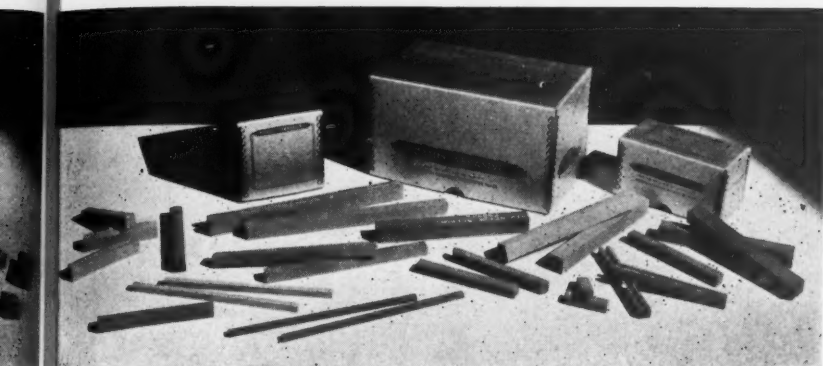
UNIFORMITY is absolutely essential in superfinishing stones and wheels because even slight variations can affect the finish obtained. Uniformity in Norton superfinishing products is assured by the exclusive Controlled Structure process plus special preparation of abrasive and bond and special molding methods. The result is uniformity not only throughout each stone and wheel but from lot to lot as well.

With the experience gained through working with Chrysler Corporation during the development stages of superfinishing and in supplying abrasives to meet their present day production requirements, Norton Company is able to supply suitable abrasives, stones and wheels for every superfinishing need.

W-715

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NORTON ABRASIVES



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ON a great many honing jobs, stock removal is an important consideration as well as finish and Norton Sticks are made to do both jobs well. In the grit sizes for roughing they cut fast and free, removing stock rapidly and giving a straight, true hole to the required size limits. In the finer sizes for finishing they quickly produce any desired quality of surface.

Norton Sticks are available in either Alundum or Crystolon abrasive and are made by the patented Controlled Structure process. They are available in sizes and shapes for all types of honing machines. If you are interested in refined surface finishes for your products Norton engineers will be glad to work with you on the selection of the proper abrasives.

PARCESTER, MASS.

W-716

NORTON ABRASIVES



President N. W. Pickering addressing the Farrel-Birmingham apprentice graduates and guests at the annual graduation exercises.

Farrel-Birmingham Apprentices Graduate

C. ARTHUR DuBOIS, executive secretary of training committee of Scovill Mfg. Company, was the speaker at the second annual graduation exercises of the Farrel-Birmingham Company apprentices, held in the class room at the Ansonia (Conn.) plant on Monday, June 12, 1939. Diplomas were presented to fourteen 1939 graduates, while seven 1938 graduates received special recognition and were given official diplomas.

An American flag for use in the class room was presented on behalf of the apprentices by George Crook, Jr., one of the graduates.

The exercises were opened with an address of welcome by Roland G. Hartwell, Apprentice Supervisor. Following the presentation of the flag, Albert S. Redway, vice president, took charge and brief congratulatory

talks were given by various officials of the company.

Greetings were extended to the graduate apprentices by Nelson W. Pickering, president of Farrel-Birmingham Company, who introduced Mr. DuBois. Mr. DuBois' interesting and inspiring talk was followed by the presentation of official diplomas and the joint International Correspondence Schools' certificates by Mr. Redway.

Seven machinists, one pattern-maker, five foundry and one welding apprentices received 1939 diplomas, while five machinists, one pattern-maker and one foundryman received official 1938 diplomas.

Engineering handbooks were distributed to the graduates through the courtesy of W. G. Venn, New England Director of the I. C. S.

WHY DIDN'T SOMEONE TELL ME

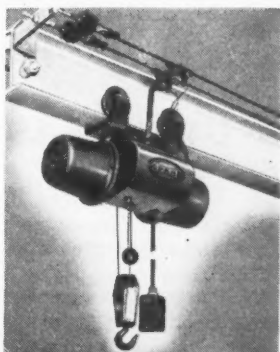
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Everybody finds it hard to believe that this full electric hoist can compete in price with many types of hand-operated equipment.

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It's the new, better way to lift, lower and move loads in production—in machine shops, welderies, foundries—on assembly floors. It's safe, easy to use, easy to install. You can mount it on a hook, jib or trolley and plug it in—handle loads up to 750 lbs. Write for bulletin H-1. Harnischfeger Corporation, 4535 W. National Avenue, Milwaukee, Wis.



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Central Armory, Cleveland, Ohio

Machine and Tool Exhibition *to be held at* Central Armory Cleveland, O.

TO accommodate the many manufacturers of machine tools, small tools, and accessories who, being non-members of the National Machine Tool Builders' Association, have been unable to reserve space in the Machine Tool Show to be held at the Cleveland Auditorium, Grob Brothers, Grafton, Wis., have taken over the Central Armory and are leasing space to those who desire to exhibit their products at the time of the Machine Tool Show, October 4 to 13, 1939.

Approximately 13,000 square feet of floor space is available, of which more than half has been leased at

time of going to press. Among those who have contracted for space thus far are South Bend Lathe Works, Sebastian Lathe Works, Master Tool Company, The V & O Press Co., Henry & Wright Mfg., Wiedemann Machine Co., Carl Zeiss, Inc., George Scherr Co., Delta Mfg. Co., Triplex Machine Tool Corp., and many others including some foreign firms.

The Central Armory is located at East 6th St. and Lakeside Ave., Cleveland, Ohio, approximately a block from the Auditorium. The exhibition manager is Richard C. Bonner, P. O. Box 12, Grafton, Wisconsin.



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Drilling Holes One or Two Miles deep is common in the Oil Fields. • Oil Well Drilling Tools must therefore be extremely sturdy, as well as accurately made, to withstand the tremendous strains, yet be easily assembled. • NATIONAL Thread Milling Cutters are used for machining these important parts.

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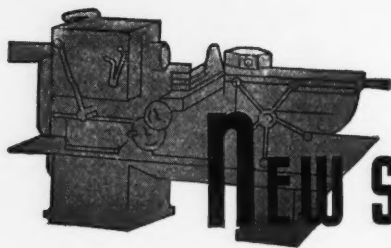
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NEW SHOP EQUIPMENT

Newton D4 $\frac{1}{2}$ -110 Unit Head Planer Type Milling Machine

A straight line milling machine that handles milling operations on a production basis on a number of different frames and bases of various size Diesel engines has been designed and built by the Newton Division of Consolidated Machine Tool Corporation, Rochester, N. Y. The machine, to be known as the Newton D4 $\frac{1}{2}$ -110 Unit Head Planer Type Milling Machine, employs the new Newton patented unit head box type construction which provides the flexibility required to handle a number of different parts and at the same time has the accuracy, ruggedness, and speed of a single-purpose machine.

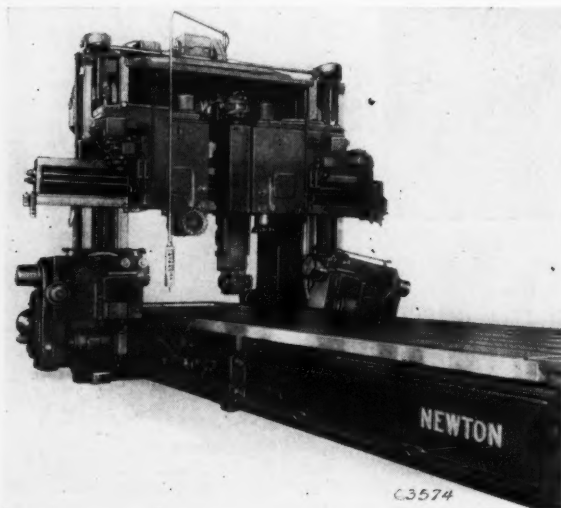
The two horizontal milling heads mounted on the uprights are of the

swiveling type, adjustable through wide arc either side of center. The two vertical unit heads mounted on the crossrail are non-swiveling and are constructed that the extension center head can be bolted to either one of them and to the crossrail. A series of bolt holes in the center head permits mounting it in a wide range of positions vertically with reference to the crossrail, thus keeping overhang at a minimum. This head derives its feed and traverse horizontally and vertically from the head to which it is bolted and the crossrail. An extension center head facilitates the milling of bearing cap locks and seats.

The right angle milling attachment shown mounted on the left hand vertical head adds to the usefulness and versatility of the machine. With the attachment fastened in position

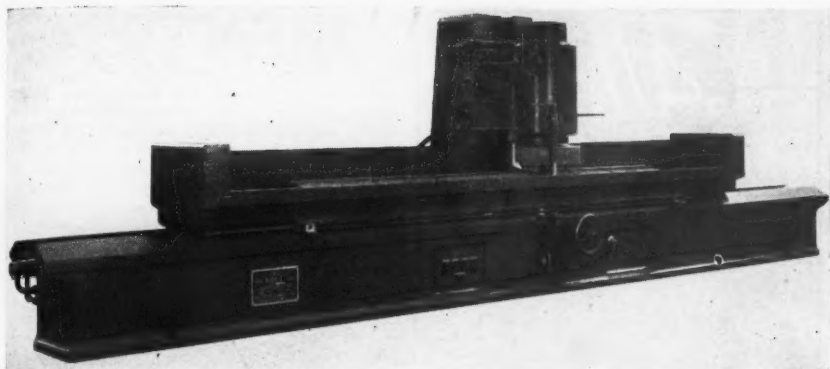
shown, the ends of frames may be milled without disturbing the set-up. Up and down movement is obtained from the crossrail. Provision is also made for a bracket support (not shown) which may be mounted on the crossrail when required for use with a horizontal arbor driven from either horizontal head.

Feed and power traverse are provided for each head and the crossrail through motors connected to gear boxes. Table feed is from a motor connected to a gear box with



C3574

Newton D4 $\frac{1}{2}$ -110 Unit Head Planer Type Milling Machine



Hill Vertical Spindle Open Side Heavy Duty Hydraulic Surface Grinder

clutch for selecting between rapid traverse and feed, and is transmitted through a revolving large diameter coarse pitch screw operating stationary nut bolted to the underside of the table.

The application of graduated scales, dial indicators, and pointers facilitate setting up work and adjusting cutters. Push button control is used extensively throughout with dual control on each side of the machine wherever practical. A pendant switch handles table feed and traverse, and rail head feed and traverse. Table ways and feed gears are lubricated through a motor driven pump. Cutting coolant is supplied to the cutters by a motor-operated pump.

Precaution for preventing damage to the machine is carefully worked out and the machine is protected through limit switches. Interlocks are so connected that the feed motors stop before the spindle motors do, and should table way lubrication fail for any reason, feed and traverse motors stop. A total of 17 motors is required for this machine, ranging from fractional up to 15 horsepower.

Hill Vertical Spindle Open Side Heavy Duty Hydraulic Surface Grinder

The Hill Clutch Machine & Foundry Co., 6400 Breakwater Ave., Cleveland, Ohio, has announced the addition of a vertical spindle open side grinder to the line of Hill Heavy Duty Hydraulic Surface Grinders.

The model illustrated is 18 x 168 in.

in size, and the vertical spindle carries a 26-in. diameter segmental grinding wheel. The machine is supplied with a table of either 18 or 24-in. width and from 6 to 20-ft. length. Outstanding features are the vertical spindle with dynamically balanced built-in motor, open side design offering maximum accessibility and convenience for the operator, massive construction ensuring permanent accuracy and absence of vibration, low operating cost, precision grinding, and fully hydraulic table drive.

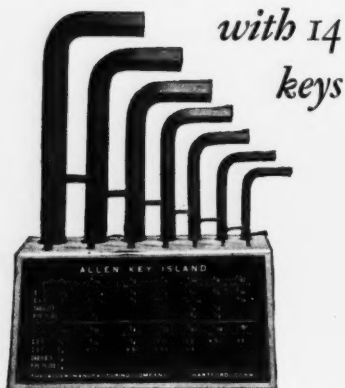
S. & H. No. 0 Universal Segment Type Spring Coiler

Two hundred springs (No. 28 wire, diameter 0.004 to 0.028 in.) per minute can be coiled with the improved No. 0 Universal Segment Type Spring Coiler, 24-In. Model, Series 668, manufactured by Sleeper & Hartley, Inc., Worcester, Mass. This machine, with standard equipment, is said to coil and cut all kinds of compression and extension springs from wire having a diameter of from 0.004 to 0.028 in. Inside diameters of the springs coiled on the machine range $\frac{1}{8}$ to $\frac{1}{4}$ in. Through adaption of special auxiliary gearing usable only with variable speed transmission drive, wire feed can be increased from 24 up to 36 in. on wire diameters up to 0.020 inches.

The S. & H. 24-In. Model Spring Coiler is of greatly improved and more rugged design and includes many exclusive features such as a one-piece cast iron housing for rigid and perfect

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Key Island



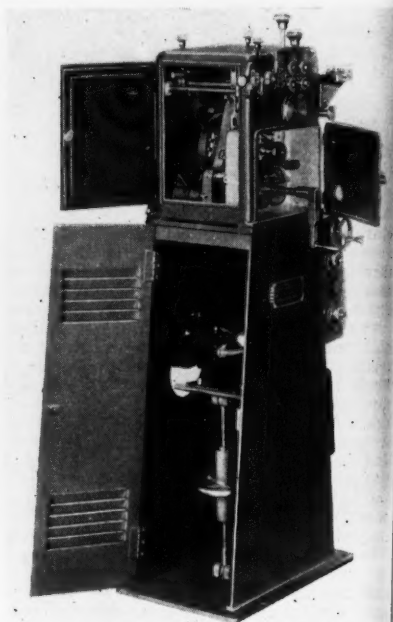
for your bench

This handy key set contains 14 keys fitting all sizes of set screws up to and including $1\frac{1}{4}$ "; cap screws up to 1"; shoulder screws to $\frac{3}{4}$ " and pipe plugs to 1".

The container is plainly labelled to show the correct size key to use with each screw. Price, complete, \$2.35.

THE ALLEN MFG. COMPANY
BARTON, CONN. U. S. A.

alignment, ball bearing construction throughout on all rotating shafts, rapid and micrometer adjustment of compound blocks to facilitate set-up time, and readily accessible pitch and diameter cam controls. Heretofore such controls were adjusted by reaching inside the machine. However, with the improved coiler, a recessed cabinet located on the front side of the machine



S. & H. No. 0 Universal Segment Type Spring Coiler, 24-In. Model, Series 668

and covered by a hinged door provides an accessible point from which the cam controls are adjusted. In case of a change or special spring, both pitch and diameter cams can be shaped, timed, and affixed to the cam hub which, as a single unit, may be removed from the shaft without losing the timed relations. One-piece solid cams can be used on the removable cam hub.

The S. & H. No. 0 Universal Segment Type Spring Coiler is available in three types of drive; namely, a motor and variable speed transmission drive, variable speed motor pulley drive, and

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5 ACRE WINDOWLESS PLANT gets *"better than daylight"* results



Interior view of Simonds Saw and Steel Company's Windowless Plant, Fitchburg, Mass., showing Cooper Hewitt Fluorescent installation.

...with Cooper Hewitt Fluorescents

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All daylight has been excluded from this five-acre plant — it is lighted entirely by Cooper Hewitt Fluorescent Lamps. The installation consists of some 1500 lamps which provide a uniform level of detail-revealing light throughout the plant for high production efficiency.

The Cooper Hewitt Fluorescent type tubular light source has an efficiency of 50 lumens per watt, producing a total output of 5000 lumens. This high output, several times that of the

equivalent wattage incandescent lamps, adapts the lamp ideally for general plant illumination. The cool blue-white color produced by this lamp gives a cheery atmosphere in the plant at all times.

It will pay you to learn of this latest and most productive industrial light source. Write for complete details and a copy of the new Bulletin. General Electric Vapor Lamp Company, 827 Adams Street, Hoboken, New Jersey.

GENERAL  ELECTRIC
VAPOR LAMP COMPANY

501P

July, 1939

MODERN MACHINE SHOP 121

pulley drive (flanged pulley and clutch). Weight of the machine is 575 lbs. including motor and variable speed transmission drive. Motor recommended, $\frac{1}{2}$ h.p., 1,800 revolutions per minute.

Michigan Improved "860" Rotary Gear Finisher

Increased gear accuracy and smoother finish are said to result from the incorporation of numerous improve-



Michigan Improved "860" Rotary Gear Finisher

ments and refinements in the Michigan "860" Rotary Gear Finishing Machine, product of Michigan Tool Company, 7171 E. McNichols Rd., Detroit, Mich.

In large part responsible is an entirely new drive from motor to cutter spindle and table feed, employing two sets of Cone area-contact worm gears. The adoption of these gears has eliminated some ten gears in the driven chain, and has improved smoothness to such an extent that the machine is said to be almost completely noiseless in operation. The increase in efficiency is such that the motor horse-

power requirement to drive the machine has been cut in half, even though the load for the coolant pump has been added to the main motor load.

The more constant velocity of cutter spindle and table feed on the improved "860," resulting in increased gear accuracy and smoothness, is attributable to the fact that in Cone gearing, more teeth are in contact than in conventional gearing. Moreover, the greater area of contact between each pair of teeth is expected to reduce wear to a minimum and improve life at maximum efficiency.

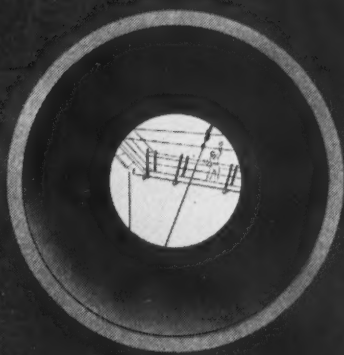
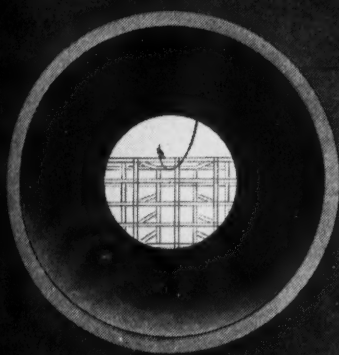
Since the "860" is used by gear manufacturers producing numerous sizes and types of gears on the same machine, provision has been made for an indicator attachment which permits rapid re-setting of the machine for finishing sizes and types previously cut.

Another improvement reflected in time saving is the provision of a 4 to 1 ratio table life mechanism. This control is used for raising the work spindle into proper relation with the cutter spindle after loading, and for dropping the table for unloading. Other improvements include the complete enclosing of the machine lubrication system, using high pressure fittings in easily accessible locations; the use of precision ball bearing construction throughout in head and tailstocks, and so on.

Rogers Type C1 Circular Knife Grinder

To meet the demand for a precision low-priced circular knife grinder of suitable capacity for grinding every variety of single or double circular knife from 1 to 8 in. in diameter inclusive, Samuel C. Rogers & Co., 185 Dutton Ave., Buffalo, N. Y., have placed on the market the Type C1 Bench Type Circular Knife Grinder. The illustration shows the machine with wet grinding attachment, but it can also be furnished as a dry unit without the wet attachment.

A one-piece cored-type cabinet base design provides positive assurance for true knife rotation and precision accuracy under the heaviest conditions. Adjustments to meet all requirements for circular knife grinding are provided by three slides with handwheel screw controls. Each slide is carefully fitted with adjustable steel gibs to take up wear. The swivel is graduated to ensure the correct grinding angle. The same angle is maintained without any change from



A CAST IRON THAT CUTS COSTS

Especially tough service requirements need not call for expensive alloy combinations. Often a less costly, but judiciously chosen, material will do the work.

Such was the case with castings for reservoir discharge nozzles and lock-gate valves. Physical specifications called for 55,000 — 65,000 p.s.i. tensile strength, 5,300 — 6,000 lb. transverse strength (12" centers), 220-240 Brinell hardness.

All this plus the ability to withstand the corrosion of water containing sulphuric acid from mine drainage.

Copper-Molybdenum Iron containing 0.80 — 1.00% Copper and 0.30 — .40% Molybdenum met all the requirements of strength, hardness and acid resistance. The lock-gate valves have been in service 2½ years without noticeable signs of corrosion or erosion.

Investigation may show where you, too, can apply Molybdenum iron to advantage. Our technical book "Molybdenum in Cast Iron" containing a wealth of practical data, will be sent free on request to interested production executives.

PRODUCERS OF MOLYBDENUM BRIQUETTES, FERRO-MOLYBDENUM, AND CALCIUM MOLYBDATE

Climax Molybdenum Company
500 Fifth Avenue · New York City

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MACHINE TOOLS

MODERN MACHINE SHOP

A new high in advertising value is being set by the September Machine Tool Show Issue of MODERN MACHINE SHOP. Advertisers get the advantage of the following features in this important number:

1. Every copy of the September Issue will be Spiral Bound.
2. Most thorough coverage of the metal-working field with more than 30,000 circulation.
3. Floor plans of entire show, giving locations and numbers of booths.
4. Entire issue will be devoted to Cleveland show. Will include illustrations and descriptions of new machines and equipment on exhibition.

MODERN MACHINE SHOP 43

The Most Widely Read Magazine in

September, 1939

SHOW ISSUE

CHINE SHOP

5. Extra copies will be distributed to show visitors from our booth.
6. Handy, pocket size makes this number a convenient guide to the show.
7. September Show Issue to be placed in mails two weeks before opening of the show.

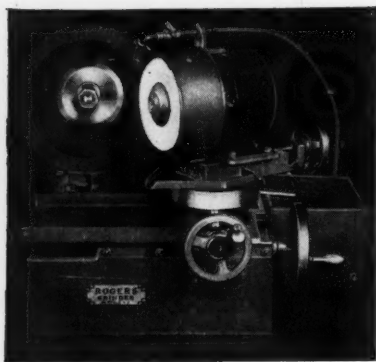
The combination of these features will place the very highest degree of reader interest in the September Show Issue of MODERN MACHINE SHOP. For exhibitors, as well as non-exhibitors, it therefore offers a most valuable means of promoting equipment purchases. Decide now how much space you want and send us your reservation promptly. Regular advertising rates apply.

431 MAIN ST. CINCINNATI, OHIO

in the Metal-Working Field

wear of the grinding wheel or change in the size of the knife.

The grinding wheel, which is 6 x 1/2 x 1/2 in., is placed on a 1/4 h.p. totally



Rogers Type C1 Circular Knife Grinder

enclosed direct motor-driven arbor mounted on ball bearings, adjustable for elimination of end play. The motor is mounted for swiveling horizontally which enables grinding at any desired angle.

The knife is rotated by separate motor through V-belt. The knife is mounted on a suitable arbor with flanges of the proper size to rigidly support the knife during the grinding operation. A knife with arbor holes as small as 1/4 in. can be mounted. When the wet attachment is used, the motor is equipped with a double shaft with V-pulley and belt to drive it.

The wet attachment consists of the tank, centrifugal pump, pipings, and pet-cock complete. The weight of the grinder is approximately 300 lbs. Size, 18 x 21 in. Standard motors are for lighting circuit current. Each machine is entirely self-contained with control switches conveniently mounted on the motors, and is very simple to operate. This same type of machine is also available in two larger sizes: No. 2 for knives up to 14 in. in diameter, and No. 3 for knives up to 20 in. in diameter.

Cross No. 50 Gear Tooth Chamfering Machine

Cross Gear & Machine Company, 3250 Bellevue Ave., Detroit, Mich., has placed on the market the No. 50 Gear

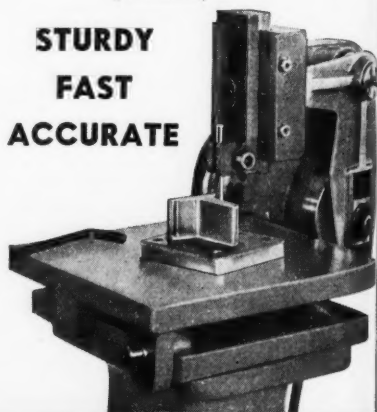


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Eliminate the slow, tedious
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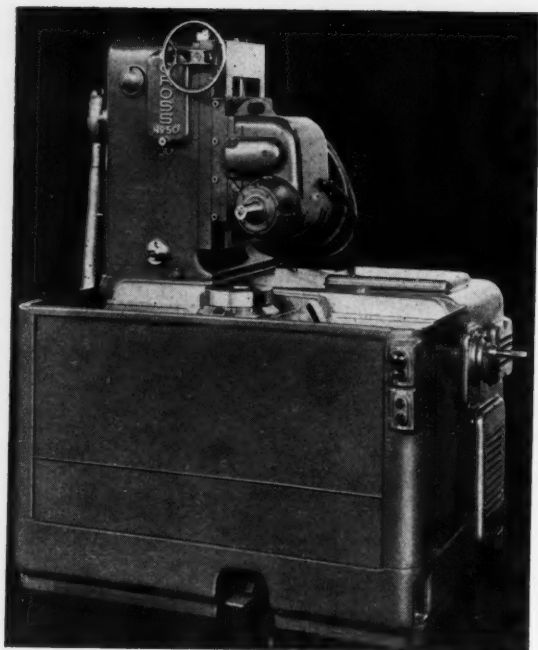
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BONDED WHEELS

VISIT THE BAKELITE EXHIBIT, HALL OF INDUSTRIAL SCIENCE, NEW YORK WORLD'S FAIR, 1939

July, 1939

MODERN MACHINE SHOP 127



Cross No. 50 Gear Tooth Chamfering Machine

Tooth Chamfering Machine, an automatic, full universal machine for rounding, pointing, chamfering, and burring all types of internal and external gear teeth. It utilizes the pencil point type of cutter. The same basic operating principles used in previous models have been retained in this improved No. 50, but the general design, construction, and mechanisms have been refined and advanced.

The vertical motions of the cutter are cam-actuated and controlled in synchronized timed relation with the rotary motion of the work. On the inside of the column is mounted a vertical slide which carries the cutter head on one side and the cam on the other. When the main drive motor is started, the work rotates and the cutter spindle moves vertically because the cam actuates the vertical slide in synchronized relation with the rotation of the work spindle. Rated in terms of spur gears, the machine has the following capacities: 0 to 25 pitch, 6 to 18-in. face, 0 to 18-in. diameter, .5 to 140 teeth. Adjustments are available for helical gears of any angle either right or left hand helix. Nominal capacities vary from those mentioned above in the consideration of helical or internal gears.

Complete electric control is centralized at the operator's station and the front chip pan apron may be quickly lifted and removed for access to the coolant tank and chip trough. The column is adjustable on the base from the front of the machine to take care of gears of various diameters and the cutter head may be elevated or lowered from the operator's position with the handwheel above.

A shell type motor is built into the cutter spindle housing and the spindle serves as a shaft for the motor, thereby eliminating the necessity for flexible

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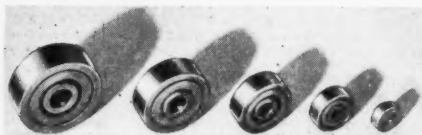
NO TI
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UNIVE
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without

HANNI

Miniature

**R
M
B**



BALL BEARINGS

Outside Diameters from .060"

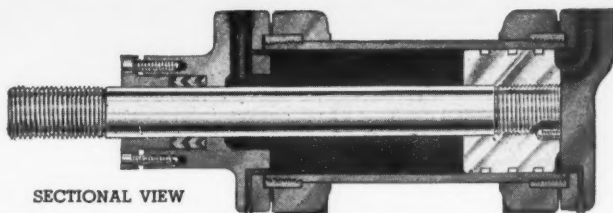
A complete line of small, carefully made ball bearings for radial, axial or angular loads. R.M.B. Bearings minimize friction and assure a sturdy and durable product. Easily mounted — widely adaptable.

Write for catalog No. 2B.

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STRONGER, SIMPLER HYDRAULIC CYLINDERS



SECTIONAL VIEW

The advantages of hydraulic power are reinforced by the exclusive, patented construction features of Hannifin hydraulic cylinders. They are stronger, simpler, easier to apply. Parts are interchangeable. High efficiency operation and ability to withstand severe service are assured.

NO TIE RODS: This simpler design is stronger, and eliminates a source of leakage. End caps may be removed without collapse of other parts of the assembly.

UNIVERSAL CAPS: Either end cap may be positioned independently so that inlet port is at top, bottom or either side. End caps may be moved without disturbing cylinder mounting or other parts.

AIR VENT PLUGS: Each end cap has air vents on three sides. With inlet port at either side or bottom there is always an air vent plug at the top.

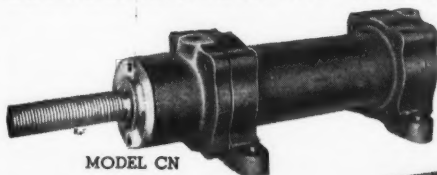
LEAKPROOF: Special mirror-finish honing gives a cylinder bore that is straight, round, perfectly smooth. Perfect piston seal with minimum fluid slip is assured.

MANY TYPES AND SIZES: Available in six standard mounting types, with small diameter piston rod, 2 to 1 differential piston rod, or double end piston rod, in all sizes, for working pressures up to 1000 and 1500 lbs. sq. in. Other types built to order.

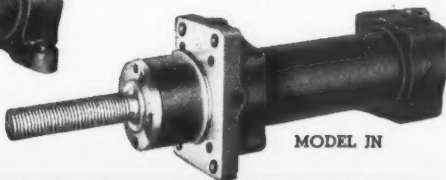
Write for Bulletin 35-MM with complete specifications.

HANNIFIN MANUFACTURING COMPANY • 621-631 SOUTH KOLMAR AVENUE • CHICAGO, ILLINOIS

ENGINEERS • DESIGNERS • MANUFACTURERS
Pneumatic and Hydraulic Production Tool Equipment



MODEL CN



MODEL JN

HANNIFIN HYDRAULIC CYLINDERS

transmission mechanisms. The power source and spindle are one integral unit in this type of construction, which features uniform cutter speeds, smooth operation, improved quality, and maximum cutter life. When the machine is started with the push button, power rapid traverse automatically advances the cutter head until the cutter is engaged with the work. After the gear is chamfered, the cutter head is automatically retracted by power rapid traverse and the cutter is withdrawn from the work. The Cross Auto-Stop is an electric controlling device which may be adjusted to accommodate work cycles of varying time intervals.

The name plate compartment contains the cam and the Patented Pitch Selector which are easily accessible and automatically lubricated. The Patented Pitch Selector enables the operator to set the machine up for any pitch with one screw adjustment. All gears, regardless of the pitch or number of teeth, are chamfered with the same cam when the machine is equipped with the selector. Indexing variations are obtained with standard change gears and the change gear box is easily accessible.

Both the cutter spindle and work spindle are specially designed and constructed for climb-cutting operations which improve quality, increase cutter life, and reduce cutting pressure. Climb-cutting is said to be a highly desirable process in gear tooth chamfering operations—particularly where it is necessary to round the ends of helical teeth.

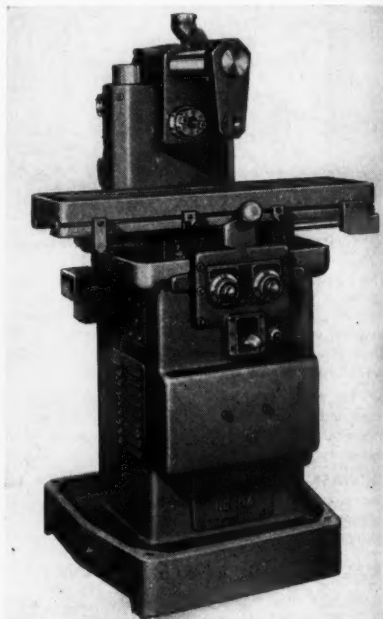
Kent-Owens Hydraulic Milling Machines

Conventional cast column construction has been abandoned in the Nos. 1-14 and 1-8 Hydraulic Milling Machines brought out by the Kent-Owens Company, Toledo, Ohio. Instead, the head is mounted on two cylindrical ground steel posts with the spindle positioned midway between them. According to the manufacturer, the post mounting is simple and permits extreme accuracy in manufacture. For either direction of table feed, the full projected area of both steel posts is said to resist all forces on the milling cutter regardless of direction.

The hydraulic feed employed for all table movement is one noted for inherent smoothness and freedom from

chatter or vibration. The control panel and hydraulic pump used are standard commercial units. The pump is driven by a separate motor which, together with the pump, is conveniently mounted for accessibility.

The main drive to the spindle is extremely simple, there being only two gear contacts between the motor and the milling cutter. One of these is a pair of pick-off gears which provides



Kent-Owens No. 1-14 Hydraulic Milling Machine

a range of spindle speeds from 100 to 1,335 r.p.m. or 150 to 2,000 r.p.m. The spindle drive motor is a standard 1 h.p. ball bearing, totally enclosed, foot-mounted motor.

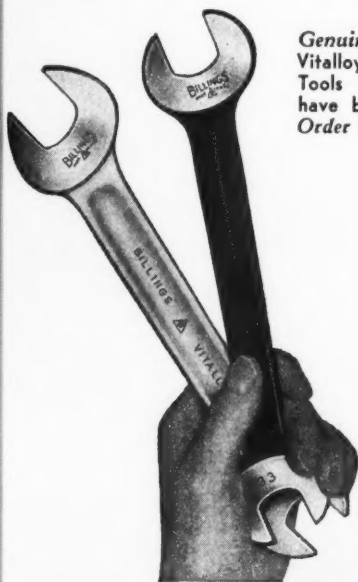
All table movements are made by means of a conveniently located control lever, while feed rates from $\frac{1}{2}$ in. to 80 in. are provided by two graduated dials. Dogs provided on the front of the table can be set to govern the particular stroke and table cycle desired. Cross movement is obtained by means of a quill having a $2\frac{1}{2}$ -in. adjustment, while the head of the machine can be moved vertically to a

Genuine Wrenches

*Now owned, manufactured
and sold by BILLINGS*

The same dependable qualities which have characterized *Genuine COES* and *Bemis & Call Wrenches* for so many years will be maintained by *Billings*—there is only one *Genuine "COES"* Wrench and it's now made by *The Billings & Spencer Company*.

With the acquisition of the *COES* and *Bemis & Call Wrenches*, *Billings* have added over 70 Wrenches to their hundreds of styles and range of sizes. *Billings Shop Tools and Wrenches* always have been the choice of "old timers" who demand definite qualities in a Wrench.



Genuine "COES" and Billings Vitalloy and Carbon Steel Shop Tools and Wrenches always have been good—Use them. Order from your Distributor.



FORGED *Billings* TOOLS



THE BILLINGS & SPENCER CO. HARTFORD, CONN., U. S. A.

maximum of 8 in. from the table to the centerline of the spindle.

The No. 1-14 Milling Machine shown in the illustration is equipped with a 9 x 32-in. table having a table travel of 14 in. together with three T-slots and a full automatic cycle. The table can be fed or rapid traversed in either direction and automatically reversed at both ends of the stroke. In addition, it may be stopped at any desired point in its travel.

According to the manufacturer, almost any desired cycle can be obtained with the No. 1-14 machine. The table can be set so as to pass continuously and without interruption through a cycle whereby work is loaded on the table at one end while the other end is being unloaded. It can also be set for a simple automatic cycle wherein the operator manually engages the starting lever to begin each cycle. For highly accurate depth milling, the machine can be equipped with either one-way or two-way positive stops.

The No. 1-8 Milling Machine is provided with a 9 x 25-in. table having a travel of 8 in. and three T-slots. This machine is equipped with rapid traverse in both directions, feed in one

direction only, automatic shift from rapid traverse to feed, automatic reverse at one end of stroke and automatic stop at the other. If desired, the machine can be equipped with a double end automatic reverse. The No. 1-8 machine operates with the simple automatic cycle described for the No. 1-14 machine. However, when equipped with a double end automatic reverse, the machine can be made to pass through this simple automatic cycle continuously. In addition, for highly accurate depth milling, the machine can be equipped with a positive stop.

Coolant tanks having openings for draining or flushing are cast in the base of both type machines. Intake and delivery passages are self-contained in the machines, the nozzle at the milling cutter being the only piping.

Lempco "Du-All" Turning and Grinding Machine

A turret head grinder that can be quickly swiveled from grinding to turning has been announced by Lempco Products, Inc., Dept. 1-D, Bedford, Ohio. Designated as the Lempco Du-

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MANUAL SHOWS
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QUALITY

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GRINDERS



**Model
No. 500**

"Utility"

BALL - BEARING MOTOR IN HEAD

For precision grind-
ing and continuous
service . . .

Economically priced
for economical
production.

$\frac{3}{4}$ h.p. to 5 h.p.

Note these points of superiority:

Polyphase totally enclosed
motor, no dust, dirt or abra-
sives can reach bearings,
motor windings or rotor; anti-
friction bearings, permanent-
ly lubricated; enclosed wheel
guards adjustable to wheel
wear; push button starter
with overload protec-
tion; adjustable tool
rests, room for two
operators.

*Write for
New Catalog No. 54*

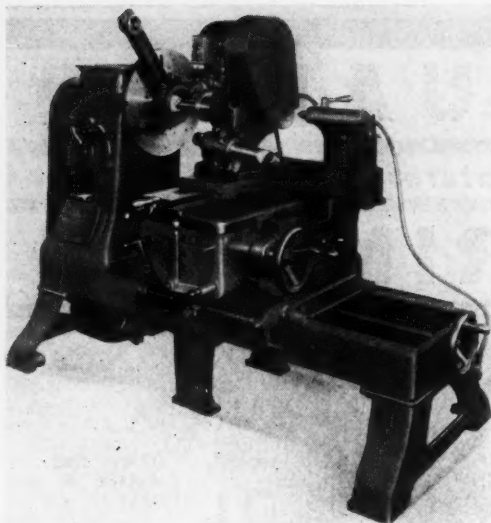
THE UNITED STATES



ELECTRICAL TOOL CO.

CINCINNATI,

OHIO, U.S.A.



Lempco "Du-All" Turning and Grinding Machine

All, the machine has a 50-in. swing and may be used on general internal, external, and face grinding and turning. Standard length of the bed is 6 ft.; however, it can be supplied in any length. On the 6-ft. model the distance between work centers is 44 inches.

The grinder motor is a specially designed 2 h.p. unit, driven by V-belts, a precision type spindle rotating in super-precision type ball bearings. The bearings are mounted in matched pre-loaded pairs at both ends of the grinder quill. Four spindle speeds and three feed ratios are quickly lever-changed. The reversible drive works in conjunc-

tion with a reversible coolant system.

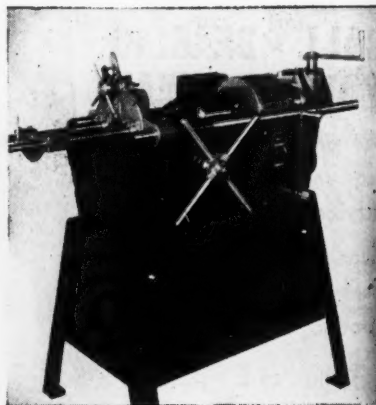
The turret head containing the cutting tool and grinding wheel is mounted on the cross slide and swivels on a diagonal plane. The head is indexed, permitting positive re-locating.

Toledo 2-In. High Speed Pipe Threading Machine

The illustration shows the Toledo 2-In. High Speed Pipe Threading Machine now being produced by The Toledo Pipe Threading Machine Co., 1440 Summit St., Toledo, Ohio. The machine has a range of from $\frac{1}{8}$ to 2 in., and is equipped with a special measuring device and collet chuck into which work can be chucked without stopping the spindle. The collet pads and die heads for each size of pipe are easily and quickly changed, a feature which is said to make

the machine ideal for production and jobbing work.

The Toledo 2-In. High Speed Pipe



Toledo 2-In. High Speed Pipe Threading Machine

Threading Machine is equipped with a four-blade cut-off mechanism, combined reaming and chamfering or straight reaming tool, and separate die heads

STRAIGHT-CIRCULAR-IRREGULAR CUTTING OF SHEET METAL



BEVERLY cuts flat to any size or shape. Three sizes: No. 1, weighs 16½ lbs.; cuts up to 14 gauge. No. 2, weighs 32 lbs.; cuts up to 10 gauge. No. 3, weighs 55 lbs.; cuts up to $\frac{1}{8}$ gauge. Write for circulars and prices.

BEVERLY
Throatless Shear Co.
3004 W. 111th St.
Chicago Illinois

NOW!

Anti-Friction Efficiency

FOR EVERY LIGHT-DUTY APPLICATION AT AN EXCEPTIONALLY Low Cost

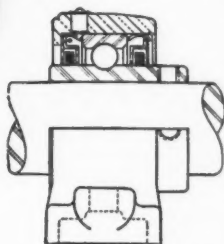
Here, at last, is a ball bearing pillow block which makes anti-friction efficiency economically practical for every type of light-duty application!

Substantially constructed — smooth in performance, yet exceptionally low in cost. The industry has been waiting for a "cost-design" pillow block like this . . . and Ahlberg engineering has met the need! Get the complete "dope" on this remarkably efficient bearing, immediately. Send for Bulletin No. ED-R2 shown at the right.

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Features of
**AHLBERG LIGHT-DUTY
PILLOW BLOCK**
(Series ED)

- ✓ ALL-METAL CAST HOUSING
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- ✓ LONG WEARING SEAL DESIGN—protects bearing, retains lubricant and insures long bearing life.

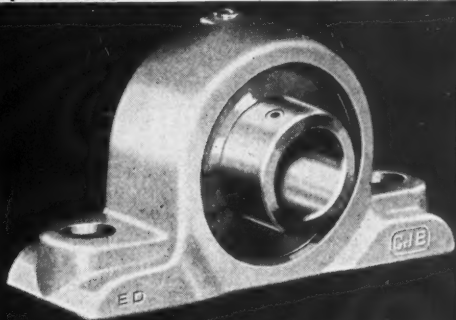
ALSO AVAILABLE IN SILENT, RUBBER - INSULATED TYPE

WRITE for this Bulletin which gives detailed information on "SERIES ED" pillow blocks shaft, sizes, prices, construction, etc.

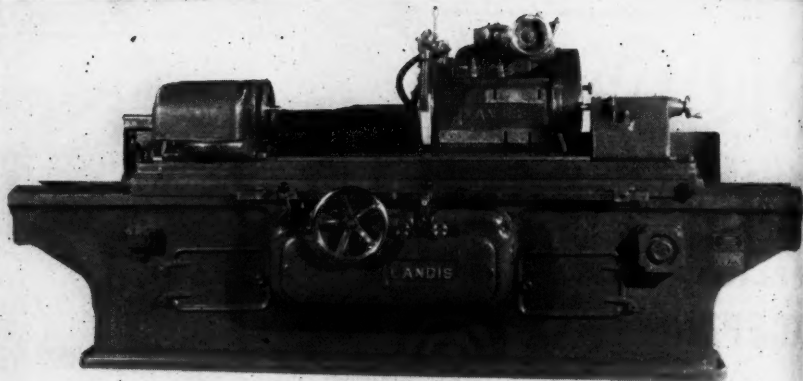


CJB
by Ahlberg

PILLOW BLOCKS



Meet us at the Machine Tool Show in Cleveland Oct. 4-14. Booth 2115.



Landis Hydraulic Universal Grinder Equipped with Landis Universal Headstock

and dies for each size of pipe. Six speeds ranging from 40 to 335 r.p.m. in either direction are available through a double clutch. The machine can also be obtained with three-jaw universal chucks.

Landis Universal Headstock

The Landis Universal Headstock—product of Landis Tool Company, Waynesboro, Pa.—which is now being supplied with all Landis Hydraulic Universal Grinders is said to be a marked departure from conventional design. It is unusually compact and simple, its smooth modern lines making it attractive and easy to keep clean.

The headstock is driven by an adjustable speed motor, the electric controls for which may be so arranged that either A.C. or D.C. current may

be used. The motor is started and stopped by means of the work and traverse start and stop lever which is convenient to the operator regardless of the position of the work table. Power is transmitted from the motor directly to the spindle by means of multiple V-belts; there is a complete absence of chains or gears. An infinite number of work speeds is obtainable. The speed ratio is never less than 12 to 1 and on some sizes is as much as 12 to 1.

Speed selection is by means of a dial on which large, easily read figures quickly enable the operator to obtain any desired speed or to repeat any desired speed. Ball bearing spindle and face plate bearings of the super-precision type are used, thus reducing power consumption. The amount of face plate overhang is less than that found on conventional headstocks.

BROACH and ASSEMBLE

At left: Self-contained 4-ton Greenerd Hydraulic Arbor Press adaptable for assembling, broaching, burnishing, etc. Adjustable ram stroke from 1/2" to 16".

At right: 12-ton Bench Press.

We also make 65 styles of Rack and Pinion Presses. Hydraulic Presses from 1 1/2 to 15 tons capacity. Write for details.

GREENERD ARBOR PRESS CO., INC.

43 CROWN ST.

NASHUA, N. H.



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your eyes are a sign of

GOOD COLD FINISHED BAR STEEL SERVICE

● Every spot on this map represents a city in which one or more Union Drawn Distributors carry complete classified stocks of dependable cold finished steels.

Locate your plant on the map. Spotted nearby you will find a distributor ready to render fast, prompt service—ready to deliver the steel bars you need in a few hours' time.

It pays to know your Union Drawn Distributor. He can save you time, trouble and money—and he is qualified to help you select the most efficient and economical steel for the job.



UNION COLD FINISHED STEELS



Landis Universal Headstock

Overall height is approximately 12 in. less than the usual height.

The spindle may be quickly made either live or dead by the use of a convenient plunger. The spindle nose is the American Standard Type A-2. To facilitate the mounting of chucks, face plates, and similar equipment, provision has been made for locking the face plate. The headstock is graduated and may be swiveled as much as 90 deg. on its base for face grinding. Dynamic braking is utilized to stop work rotation positively and automatically. The lifting of one large cover at the front exposes the motor, drive, and spindle.

Covel Dual Grinding Attachment

In many manufacturing operations it is desirable to use drills with which holes having two diameters can be

drilled in a single operation. The adoption of such drills has been retarded, probably due to the fact that they have been difficult to sharpen and recondition. With this thought in mind, the Covel Mfg. Co., Benton Harbor, Mich., has developed a dual drill grinding attachment which is designed to grind dual drills, center drills, and counterbores. The attachment is shown mounted on a Yankee Twist Drill Grinder.

After the wheel of the grinding machine has been dressed to the proper size and shape, the two-lip drill is inserted in the spindle of the dual grinding attachment and the drill positioned by an indicating finger. The attachment is then turned by hand. Both lips of the drill are ground the same due to the fact that the cam which regulates the clearance and throw of

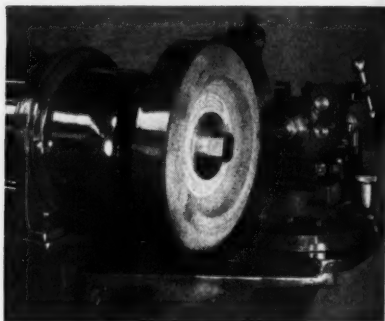



Illustration showing application of Covel Dual Grinding Attachment to Yankee Twist Drill Grinder.

the drill is geared to a ratio of two to one to the main spindle, thus the cam shaft revolves twice as fast as the

... for more than 1001 odd jobs



The HJorth Bench Lathe has the speed, accuracy, handling ease, and dependability that appeals to every operator. That's why you'll find the better shops equipping with the HJorth Lathe.

Write today for data and prices.

HJORTH LATHE & TOOL CO., 12 BEACON ST., WOBURN, MASS.

**BAND
SAW
ECONOMY**

**The fast-
accurate
WELLS!**



Built in Two Sizes

No. 8 Size—8" diameter
round or 8" x 16" flat.

No. 5 Size—5" diameter
round or 5" x 10" flat.

WHEN you say "Wells," you name these advantages: speedy, precision cutting—rugged construction—minimum upkeep costs—easy portability—versatility. A new feature saves blades—it's the hydraulic frame check which prevents the blade from dropping on the stock.

You can't ask for more—so write today for all the details.



WELLS MFG. CORP.

WELLS METAL CUTTING BAND SAWS

THREE RIVERS, MICH.

main spindle. The grinding wheel is dressed by placing a diamond in the spindle, and then using the adjustments of the cross slide to dress the wheel.

The base of the attachment is circular and can be revolved so that any desired angle can be dressed on the grinding wheel. In grinding clearance on a drill, the cam action moves the drill toward the grinding wheel in both directions so that clearance is ground on the drill both on the small diameter and the cutting edge. Three-lip or four-lip drills can be ground on the attachment by changing, in the same proportion, the gearing relation between the cam shaft and the main spindle.

In grinding center drills, the Covel Dual Grinding Attachment grinds the proper angle so that the drill will fit the center drilled in the shaft, and thus make both lips the same. Counterbores can be made by grinding down worn out drills. In automatic screw machine work, dual size drills often eliminate the indexing of the turret, and thus save positions on the turret as well as time in drilling.

The Covel Dual Grinding Attachment is made primarily for use on a Yankee

Twist Drill Grinder, but can be used on other grinding machines, provided that a cup wheel of about 10 in. in diameter is available. The attachment has a capacity for drills up to 1 3/4 in. in diameter, and a net weight of 80 lbs.

H. & Z. Motor Drive

A motor drive for application to machine tools is now being built by Hertler & Zook Co., Belleville, Pa. The drive can be had in a variety of types for application to machine tools and other machines, although the lathe drive alone is shown here.

The lathe drive consists of a rigid one-piece cast iron bracket supporting the motor, as shown. The drive is mounted on the rear of the lathe by four bolts. The top of the bracket is machined for the hinge bracket which supports the motor table and belt take-up device. Adjustment is provided to accommodate different sizes and makes of motors as required by the user. The belt take-up between the machine cone and counter shaft cone is secured through a cam lever, and ratchet belt take-up device which provides controlled tension on the belt. Either high speed or low speed

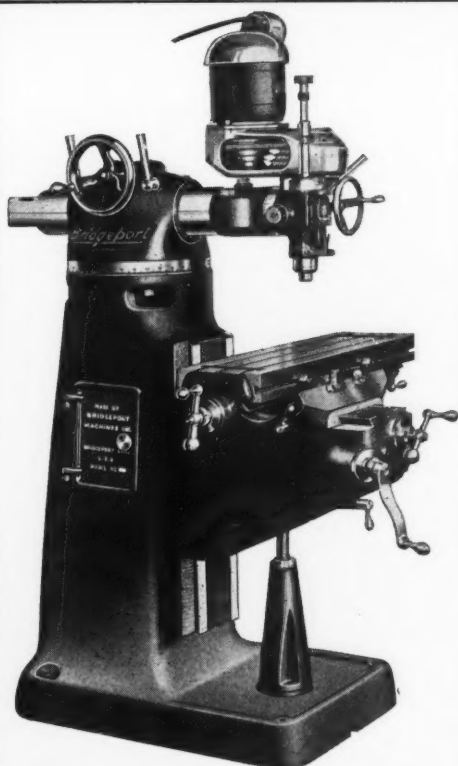
Heavy Duty, Tumbler Lock Reset Productimeter



DURANT MFG. CO.

1932 N. Buffum St., Milwaukee, Wis.

• 173 Eddy Street, Providence, R. I.



Rigidity--Flexibility--Unparalleled Range

The BRIDGEPORT *Turret* Milling Machine is a complete machine with 15" diameter turret and 5" diameter overarm. Large graduated dials $3\frac{1}{4}$ " diameter. Extremely sensitive for fine milling on molding dies — unusual range

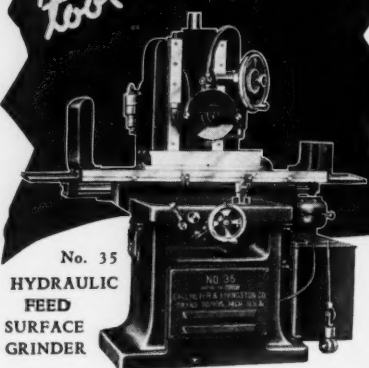
for large tool and fixture work. Hand wheel controls keyed overarm for angular settings. Also High Speed Milling Attachments for all makes of milling machines.

Write for further details.

BRIDGEPORT MACHINES, INC.
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*for
production and
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No. 35
HYDRAULIC
FEED
SURFACE
GRINDER

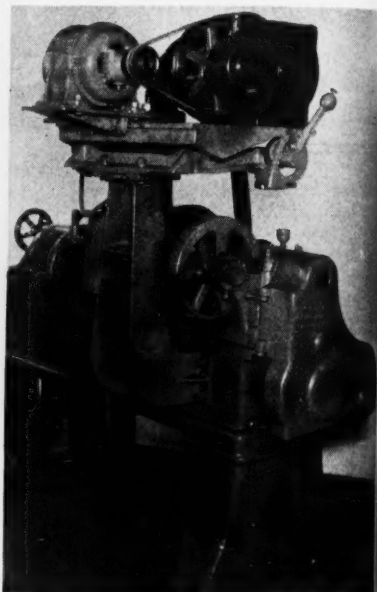
● A speedy grinder — extremely flexible — for production tool room grinding.

Longitudinal and transverse table movements operated hydraulically, any speed can be obtained up to the maximum of 115 feet per minute.

Write for catalog on this precision grinder today.

Gallmeyer & Livingston Co.
308 STRAIGHT AVE., S. W.
GRAND RAPIDS, MICH.

motor can be used. When a high speed motor is used, a combination gear and vee belt reduction is supplied to maintain the desired speed on the cone shaft.



H. & Z. Motor Drive

The drive is available for lathes of 12 to 36-in. swing, to use motors of $\frac{1}{2}$ to $7\frac{1}{2}$ h.p.

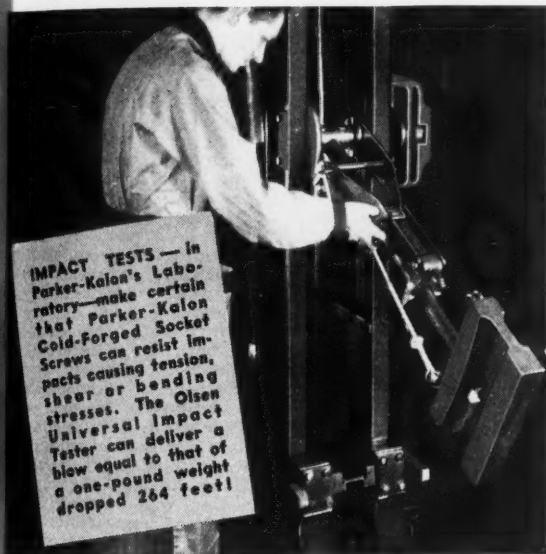
Rota-Radial Pump

A more efficient type of pump, designated as the Rota-Radial, is now being furnished with Rotary Freight, Passenger, and Sidewalk Elevators, products of the Rotary Lift Company, Memphis, Tenn. The pump, designed especially by Rotary engineers for elevator service, is reported to have an efficiency in excess of 85 per cent. This high efficiency is said to enable Rotary elevators to operate with motors of small horsepower, or to give approximately 40 per cent more power or speed with a given motor. Other features of the pump include unusually quiet operation, practically no slipping, thus resulting in accurate speed control, and a tendency to start and stop smoothly with

SOCKET SCREWS

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TO MAKE SURE THEY RESIST SHOCK LOADS!



"16 POINT QUALITY-CONTROL" Leads

Critical Buyers to Demand PARKER-KALON

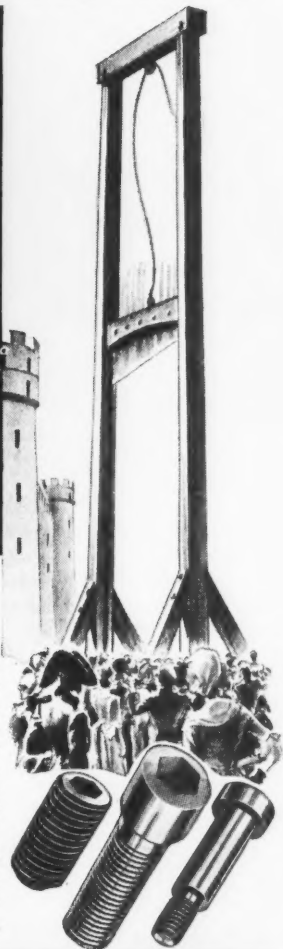
This impact test is only one of 16 check-ups on important characteristics of Parker-Kalon Cold-forged Socket Screws. In a laboratory without counterpart in the industry, quality is guarded by tests and inspections covering:

1—Chemical Analysis. 2—Tensile Strength. 3—Ductility. 4—Torsional Strength. 5—Ability to take Shock Loads under Tension. 6—Resistance to Shock Loads under Shear. 7—Hardness. In addition, there is a rigid

inspection of these essentials: 8—Head Diameter. 9—Head Height. 10—Concentricity of Head to Body. 11—Socket Shape. 12—Socket Size. 13—Socket Depth. 14—Centricity of Socket. 15—Class 3 Fit Threads. 16—Clean Starting Threads.

In this way Parker-Kalon maintains a new higher standard of quality in Socket Screws . . . a standard that satisfies the most critical buyer. Send for free samples . . . see for yourself.

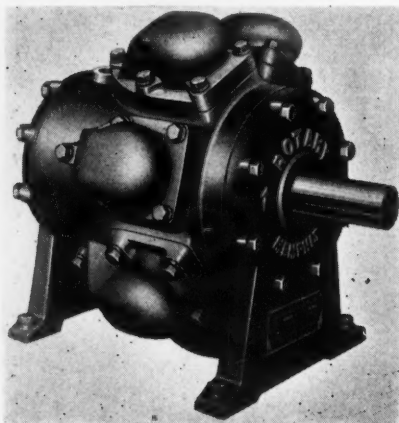
PARKER-KALON CORPORATION, 198M Varick Street, New York.



PARKER-KALON *Cold-Forged* SOCKET SCREWS

empty or loaded elevators.

The Rota-Radial Pump is a seven cylinder unit. The cylinders are constructed in a circle similar to an air-



Rota-Radial Pump

plane engine with pistons operating from an eccentric. The pump is designed for working pressures several times greater than required for elevator use.

Nopco No. 2261 Tube Drawing Compound

A stable paste compound of high titre fats, to be known as "Nopco" No. 2261, has been placed on the market by the National Oil Products Co., Harrison, N. J. The Nopco compound is formulated specifically for the lubrication of

heavy draws in the wet working of copper and brass tubes, particularly where large reductions are made, but can also be used as a lubricant for drawing heavy brass and copper shells. It is readily soluble in water and is effective in 5 per cent solution. Due to the fact that the Nopco compound consists primarily of vegetable fats, this material is not subject to the development of odor or rancidity on drawn stock.

Scafol-Car

For use in erecting machinery, hanging countershafts, repairing overhead equipment, installing or cleaning overhead lighting equipment, washing windows, and for many other similar jobs. Economy Baler Company, Dept. M. M., Ann Arbor, Mich., has brought out a portable scaffold to be known as the Scafol-Car. The Scafol-Car provides a safe, practical, portable platform. It is self-moving as well as self-raising and lowering. A safety guard railing around the platform enables the workmen to work with both hands safely.

After rolling the Scafol-Car to the job and placing the necessary tools and equipment on the working platform, the workmen lift themselves and their load to the proper height for convenient operation by simply turning the lift crank. Without getting down, the workmen can move the Scafol-Car with themselves and their load backward, forward, or in any other direction simply by turning the driving crank and thus propelling the bottom driving wheel.

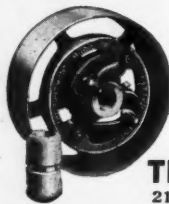
The illustration shows the Model No. 16 Scafol-Car, designed for 16-ft. ceiling maximum. Overall height in lowered position is 6 ft. 5 in. and overall height fully elevated is 12 ft. 2 in. Height of platform in lowered position

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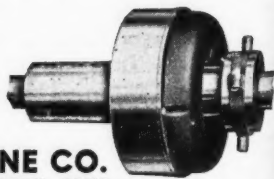
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EXPANDING "TYPE B"



Large friction surface and simplicity of its unique design are responsible for the outstanding performance of this better built clutch. For moderate speed drives of all kinds it has no equal.

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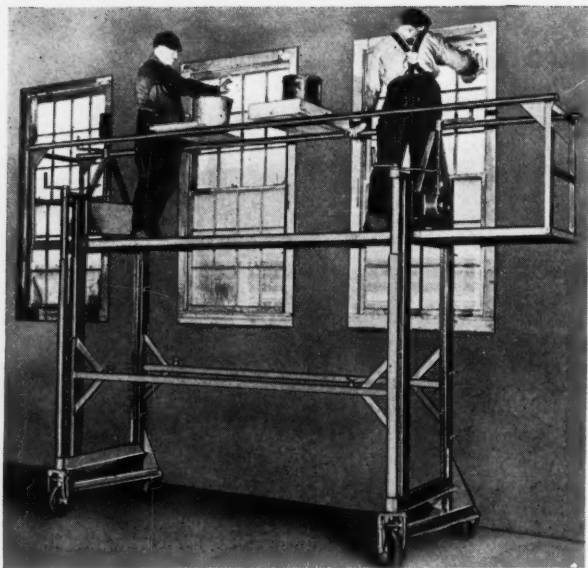
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BE SURE TO FILL IN ALL THE ABOVE INFORMATION

FILL IN, TEAR OUT AND MAIL

July, 1939

MODERN MACHINE SHOP 145



The "Scafol-Car" provides a safe, portable scaffold for hanging transmission equipment, installing or cleaning lighting equipment, cleaning windows, and so on.

1 ft. 6½ in. Distance between upright ends close coupled, 5 ft.; fully extended, 8 ft. End wheel base, dimensions, 18 x 46 in. overall. Length of standard working platform, 10 ft. Elevating speed, 2 ft. per minute; lowering speed, 4 ft. per minute. Traveling speed, 30 ft. per minute. Load capacity, 1,500 lbs. Shipping weight, 1,200 pounds.

"Service" Mechanical Die Table

A mechanical die table featuring a new type of chain and screw lift has been placed on the market by The Service Caster & Truck Company, 596 N. Brownwood Ave., Albion, Mich. The truck is all-steel, electric welded into one rigid

die with double grips makes operation of the machine possible when loads overhang. The running gear is two 10 x



"Service" Mechanical Die Table

unit. The table is of ¾-in. steel plate turned down 2 in. over an angle steel frame. It is 26 in. wide by 43 in. long. The edges of the top overhang the frame, thus it can be pushed flush against the press receiving the die. The uprights at each of the four corners are of steel channel, operating in square tubular posts. Positive cam locks hold the table solid at any point of lift.

Lowered, the top is 28 in. from the floor; fully raised, the height is 42 in., making a total lift of 14 in. The lifting mechanism is a steel screw operating through a bronze nut and actuating lifting chains or cables. A Timken bearing at the end of the screw absorbs the tremendous thrust load. A vise-type handle

in. Ni-Steel Iron wheels (rear), and a pair of 6-in. ball bearing ForgeWeld casters with right and left hand swivel locks and wheel brake (front).

The table is available in two types—the 2,000-lb. capacity model with chain lift and the 1,250-lb. capacity model with cable lift. The die table can be custom built for capacities up to 5,000 pounds.

Lufkin Automatic Center Punch

The line of machinists tools manufactured by The Lufkin Rule Co., Saginaw, Mich., has been augmented by the addition

of the No. 1671A Automatic Center Punch with adjustable stroke. The punch is said to assure accuracy and



Lufkin Automatic Center Punch

speed because only one hand is needed to operate it, the use of a hammer being unnecessary.

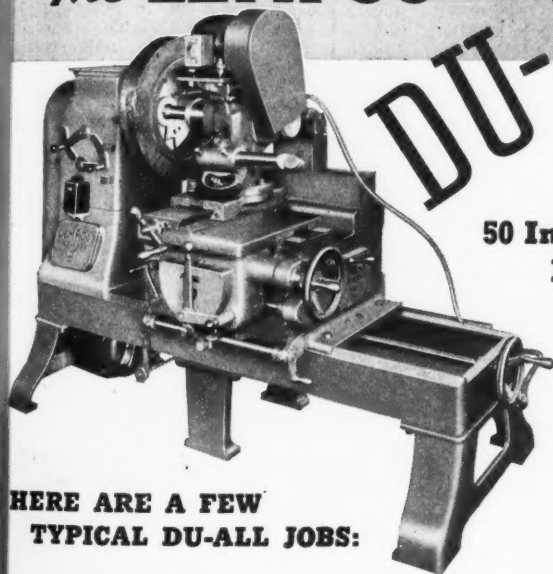
The center punch has a simple mechanism which, when the tool is held upright on the work and downward pres-

The LEMPCO

DU-ALL

DOES ALL!

50 Inch Swing Takes Most Any Job!



**HERE ARE A FEW
TYPICAL DU-ALL JOBS:**

General Internal Grinding
General External Grinding
Turning
Boring
Surface and Face Turning

Surface and Face Grinding
Large and Small Connecting Rods
Forming Dies
Deep Drawing Dies
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MAKE US PROVE IT—SEND FOR CATALOG (*A few territories still open for dealers.*)

LEMPCO PRODUCTS, INC., Bedford, O.

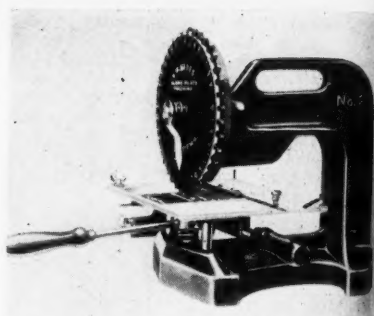
Here's a machine that fills a big gap in the industry. With its 50-inch swing and precision grinding and turning turret-head it does the work of two much more costly machines. Highest quality construction throughout assures the last word in accuracy on all jobs. Standard equipment includes reversible water pump and six-foot bed. Any size bed can be provided on order. Write Dep't. 1-D for catalog.

sure is applied, automatically strikes the blow at the will of the mechanic. For different materials, the force of this blow can be regulated by screwing the knurled cap. The No. 1671A offers a wide range of adjustment. When set for medium stroke, the length of the punch is 5 in. Its body is knurled and grooved to give the most positive grip. All working parts are properly hardened. The point can easily be removed, ground and replaced. Extra points are available.

Bates No. 2 Name Plate Stamping Machine

To meet the need for a name plate stamping machine to stamp large name plates, H. O. Bates, 251 N. Broad St., Elizabeth, N. J., has developed a No. 2 machine. Except for the increased throat dimension, the No. 2 is similar in design and construction to the No. 1 machine described on page 212 of the May, 1939, issue of MODERN MACHINE SHOP.

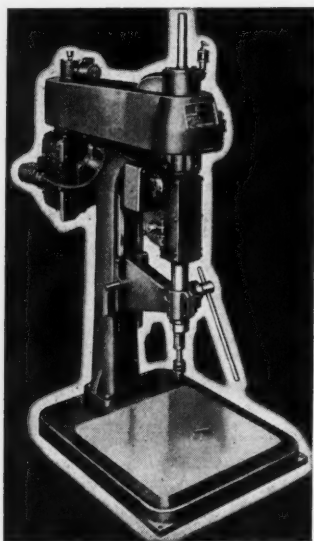
The up and down adjustment for thickness of parts of name plates is $\frac{1}{2}$ in. and the distance from the back of the throat to the face of the dies



Bates No. 2 Name Plate Stamping Machine

is 8 in. The machine will make name plates within a space $4\frac{1}{2}$ x 6 in., but name plates 8 x 8 in. in size can be held on the standard table. Special construction of the table will permit name plates of any length to be marked in the machine.

By specially constructing a table for scale beams and other metal strips can be numbered in perfect alignment. According to the manufacturer, the fact that the machine



Perfect Laps-
FASTER!

LAPPING MACHINE



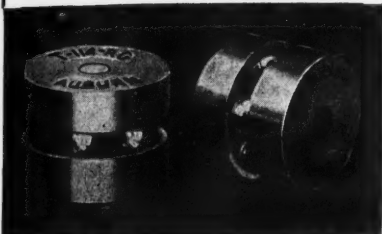
**RECIPROCATING
SPINDLE**

• Lap to a mirror finish with extreme accuracy quickly, inexpensively, with the new Onsrud S-11 Reciprocating Spindle Lapping Machine. Three spindle speeds, three speeds of spindle reciprocation. Adjustable stroke. Save money on lapping costs.

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Write for complete catalog listing stock sizes and load ratings.

AUBURN BALL BEARING CO.

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Ideal for

SINGLE PURPOSE DRILLING

Universal Collet Chucks, with ground threads hold drills with a firm, positive concentric grip on either the shank or flute. Write for new bulletin.

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**Engineering Company
Frankenmuth, Mich.**

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REAMERS
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END MILLS

ORIGINATORS of the
Helical Taper Pin Reamer
Special Reaming Problems Involved
Immediate Shipment on Stock
Tools

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SPIRAL SPECIALISTS
THE GAMMONS-HOLMAN CO. MANCHESTER, ENGLAND

adapted to a variety of parts or pieces does not alter the fact that it is exceedingly fast and accurate even on small name plates into which voltages, serial numbers, and other information can be stamped.

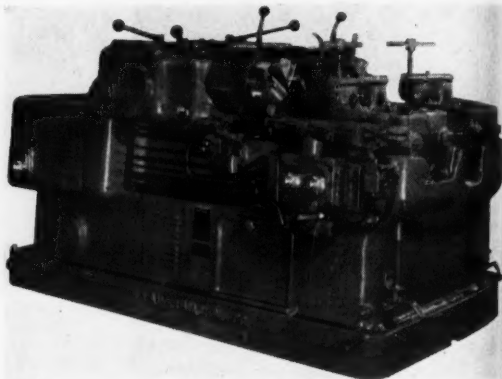
To operate, the die wheel is turned with the right hand to the letter or figure to be stamped and then the impression is made by a simple swing of the lever. With the powerful screw pressure principle, a great amount of pressure is applied with ease. The standard No. 2 machine is furnished with interchangeable and replaceable dies in any sizes from $\frac{1}{16}$ to $\frac{3}{16}$ in. Larger sizes of machines and dies can be made to order; special adaptations can be made from samples of parts that are to be marked.

Improved Lanhydro Hydraulically-Oper- ated Turning Machine

The design of the Lanhydro Hydraulically-Operated Turning Machine, originally introduced by the Landis Machine Company, Wayneboro, Pa., in June, 1937, has been changed to include a number of important improvements.

The hydraulic cycle of the improved Lanhydro Turning Machine has been made more flexible to suit every kind of material and cutting condition, and the operation of the machine has been greatly simplified. The operating cycle is now controlled by a foot pedal which leaves the operator's hands free for loading and unloading the vises or work-holding fixtures.

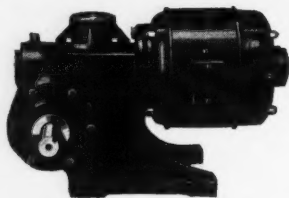
As the cycle is completed, the work is removed from the vise or holding fixture and another piece is inserted but not clamped. The operator immediately depresses the foot pedal, shown in the illustration, to start the cycle. The carriage then advances rapidly to a position where the work is about to enter the work center which is located within the bore of each turning head.



Improved Lanhydro Hydraulically-Operated
Turning Machine

This work center protrudes beyond the face of the turning head. At this point the forward movement of the carriage is checked to a very slow forward speed to permit the operator to guide the work into the work center, after which he performs the final clamping operation.

The position at which the fast forward speed of the carriage is checked is adjustable for jobs of different lengths. The slow forward movement for centering and clamping the work



ALSO ROTARY CONVERTERS—
BLOWER WHEELS—MOTOR GENERATORS

Janette Speed Reducers

43 SIZES FROM 1/50 TO 7 1/2 H.P.

The diversity of the Janette line of speed reducers enables us to supply a machine for almost any purpose. You can select the style of compact, rugged reducer to meet your individual requirements.

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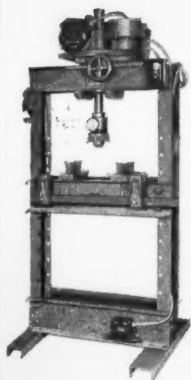
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July, 1937



LEMPCO

**All Purpose
Presses**

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**Up to 60 tons
Pressure**

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**Built to
"take it"**

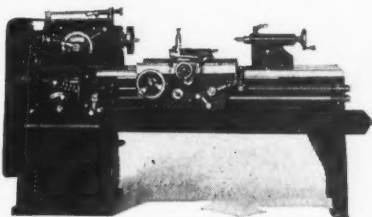
Install a Lempco Press in your shop today for pressing on arbors, setting dies or any one of the many jobs that call for a power or hydraulic press. There are different models, all of heavy I-beam and channel construction, priced to fit any shop. Write for catalogs giving all the details.

LEMPCO PRODUCTS, INC.

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BEDFORD, OHIO

New **"C & J"** **15" and 16" Lathes**



12 Speed Geared Head-Motor Drive
Timken mounted spindle
Modern Design—Liberal Dimensions

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**that will soon pay the cost
of Oliver Equipment.**



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**Let us Grind a few Drills for test—No
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**Model 510 Drill
Grinder for 1/4 to
3" drills. Auto-
matic operation
—Variable clear-
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point angles.**

OLIVER INSTRUMENT COMPANY

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**DRILL BUSHINGS FOR
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Rigid standards of manufacture and Super-finishing of the bore insures the greater accuracy of Universal Drill Bushings—identified by black dome.

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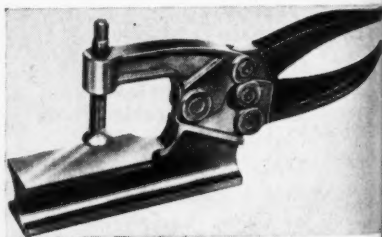
is also variable. After the work is clamped, the carriage again advances rapidly to the position where the work enters the turning head. A coarse feed is then used throughout for the turning operation. This coarse feed is variable so that it can be adjusted to suit any material or turning speed.

If the work is of a type that requires the facing of a shoulder, the cycle is so arranged that the carriage will advance under a fine finishing feed after it reaches a position within 0.005 or 0.010 in. of the shoulder. The fine finishing feed, like the slow turning feed, is also variable. The carriage advances under the fine finishing feed to a definite stop and, at that point, a variable dwell period is provided for the final clean-up cut which makes it possible to hold the work to extremely close limits in length. After the dwell period, the turning head opens and the carriage returns rapidly to the starting position to complete the cycle. The turning head automatically closes as the carriage returns.

This improved hydraulic cycle is said to greatly increase the flexibility of the Lanhydro Turning Machine and makes it applicable to a wider variety of turning operations, in addition to simplifying its operation.

Knu-Lok Plier Parallel

The Knu-Lok Plier Parallel recently placed on the market by Knu-Vin Products Co., Inc., 6432 Cass Ave.



Knu-Lok Plier Parallel

Detroit, Mich., is, as the name implies, a combination tool incorporating a hardened and ground parallel with a plier clamping arrangement. This parallel and plier clamping arrangement permits the substitution of the Knu-Lok unit for toolmakers' clamps and

COST CUTTING TOOLS

GROUND RADIAL
RELIEF



CIRCLE "R"

Combination Center Drills

Will give more production at less cost.
Be sure to demand Circle "R" Tools.

Send for Catalog "J"

CIRCULAR TOOL CO., Inc.

PROVIDENCE • RHODE ISLAND
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Philadelphia, Cleveland, New York

No Precious Carats Wasted In This Diamond Dresser

Carboloy dressers give greater diamond usage per carat. You use practically every particle of diamond throughout a large diamond impregnated matrix as shown at right.

Carboloy dressers eliminate all remounting expense, stand abuse and save at least 25% in dresser costs. Used for rough, semi-finish and finish dressing. Send for catalog DR-38.

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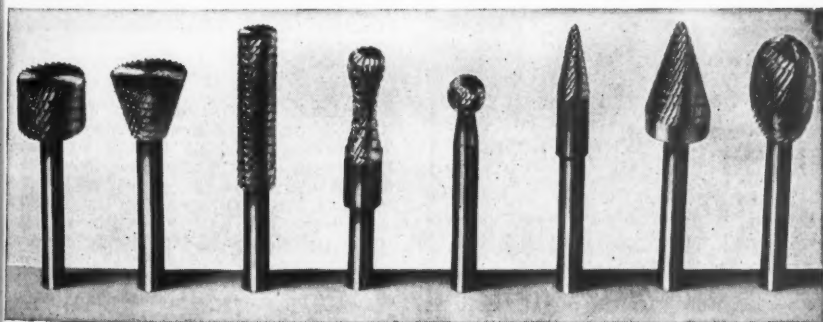
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DIAMOND IMPREGNATED WHEEL DRESSERS



FORD GROUND CUTTERS



Just a few of the many standard shapes which are carried in stock.

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M. A. FORD MFG. CO.

408 PERSHING AVE.

DAVENPORT, IOWA

July, 1939

MODERN MACHINE SHOP 153

parallels when used on the bench for layouts, and on the drilling machine when transferring holes from one section to another. The base of the unit may be furnished soft for drilling when it is desired to incorporate the Knu-Lok Plier Parallel in the design of a jig or fixture.

Blanchard Adjustable Gap Demagnetizer

The Blanchard Machine Company, Cambridge, Mass., has developed the Blanchard Adjustable Gap Demagnetizer shown in the illustration for use in demagnetizing small parts in production and also for tools and dies.

The demagnetizer has two coils, one at each side of the gap in the C-shaped core, so designed that when connected to a source of single phase alternating current, a very intense alternating magnetic field is produced in the gap. Magnetized pieces can be completely demagnetized by placing them in this field and then slowly withdrawing them. Heavy high speed steel tools can be completely demagnetized in a few seconds. Several hundred small pieces held in a wire basket can

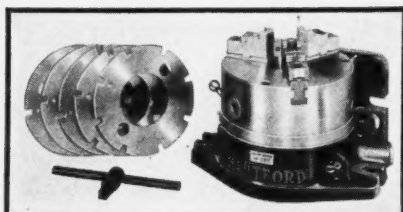
be demagnetized at once, the entire operation requiring less than half a minute.

The work may be held in the hand, or small pieces may be handled in wire baskets. The non-magnetic metal tray or shelf supports the work and protects the demagnetizer from water and dirt, therefore it can be used for demagnetizing pieces coming directly from a wet grinding operation.

The current is turned on and off by



Blanchard Adjustable Gap Demagnetizer



HARTFORD "Superspacer"

Adaptable for milling, drilling, slotting or planing. For rapid indexing, simply release clamp, withdraw index plunger, revolve turret. Standard equipment—six mask plates, self-centering chuck, sliding handle wrench.

WRITE FOR FOLDER.

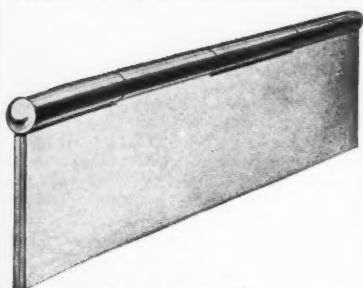
HARTFORD
SPECIAL MACHINERY CO.
HARTFORD • CONN.

a contactor controlled by a knee-operated button. This construction ensures the current being off except when the demagnetizer is in use, and leaves the workman's hands free to handle the work. The demagnetizer is usually wound for use on 110 or 220 volts, 60 cycles, single phase alternating current, but can be wound to order for other voltages. Direct current can not be used. The contactor and push button are separate, to be mounted by the customer.

Specifications are as follows: gap adjustable from 1 to 6 in.; throat distance center of poles to vertical part of core 8 in.; overall dimensions, including tray, 25½ in. long, 23½ in. wide, and 26 in. high. Net weight, 325 pounds.

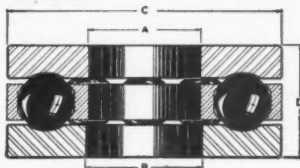
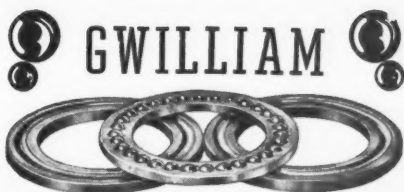


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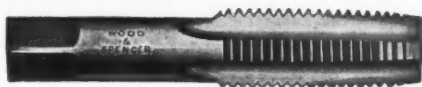
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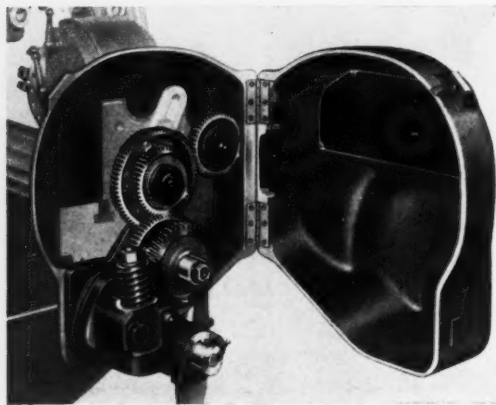
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B & S No. 20 Short Lead and Feed Reducing Attachment for B & S No. 2 Milling Machines

Illustrated herewith is the No. 20 Short Lead and Feed Reducing Attachment which has been designed by the Brown & Sharpe Mfg. Co., Providence, R. I., for use on B & S No. 2 "Light



B & S No. 20 Short Lead and Feed Reducing Attachment in use as feed reducing attachment.

Type" Universal Milling Machines. This attachment is adaptable for obtaining shorter leads than can be cut by using the change gears regularly furnished with Universal Spiral Index Cutters, and, in addition, for obtaining fine longitudinal table feeds.

When using the No. 20 attachment, the regular drive to the table screw is disengaged by a clutch provided on the

milling machine. The screw is driven instead through a worm and wheel and spiral change gears which provide three different ratios; namely, 1-20, 1-200, and 1-400 of the feed rate for which the machine is set. The gearing referred to is carried by a bracket mounted at the left end of the machine table in place of the table screw dial bracket. The assembly of the No. 20 attachment thus, in use as a feed reducing, is shown in the illustration. When used as a short lead attachment, the table is driven in the same manner at the reduced rate desired, while the headstock is driven at a normal or unreduced rate from the table feed shaft through a different gearing arrangement. Leads from 0.01250 to 3.0000 in. are said to be obtained with this attachment.

The spur change gears furnished supplement those regularly supplied with the Universal Spiral Index Centers, and a table of leads together with a diagram and formulas simplifies the selection of the short feed or feed reduction desired. The handcrank provided can be used on the lower shaft for manual feed or, for quick adjustment of the table position, the spiral gears can be quickly disengaged and the crank applied to the end of the table screw. The hinged aluminum alloy guard covers all gearing during power operation. When the B & S No. 20 Attachment is not on a machine, all parts of the attachment can be stored in the wooden case provided with it.

The net weight of the attachment is 85 lbs. and the shipping weight is 115 pounds.

THORoughbred STAMPS

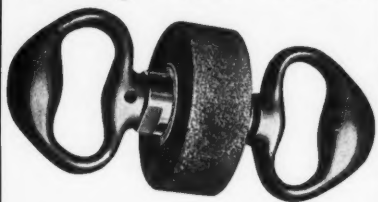
THOR STAMPS are made of special, long-life alloy steel to give you consistently clear marks for a long time. A central striking point assures uniform indentation. Thumb side-marking makes them easily read—easily used. THOR STAMPS mean

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The Desmond CRACKERJACK Grinding Wheel Dresser



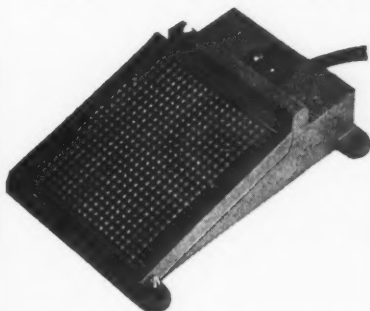
The 4" dia. wheel is mounted on dust protected ball bearings with safety type handles.

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STRENGTH ... ACCURACY ... UNIFORMITY get all these features and avoid production delays SPECIFY



Fig. 232



Fig. 1434



Fig. 1446

Fig. 232—"Unbrako" Hollow Set Screw. Points won't mushroom; hex won't round.
Fig. 1434—Knurled "Unbrako" Socket Head Cap Screw. Has knurled grip head that speeds production, permits locking after countersinking. (Pats. Pend.)
Fig. 1446—Knurled "Unbrako" Socket Head Stripper Bolt. Knurled head turns easier; socket head permits compact designs.

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Skilsaw "Zephyrplane" Sander

The illustration shows the Skilsaw "Zephyrplane," a streamlined 3-in. belt sander which has been announced by Skilsaw, Inc., 5037 Elston Ave., Chicago, Ill. The tool incorporates many new features which, it is claimed, make it outstanding in performance and ease of operation. It has been developed particularly for those users whose work does not justify the purchase of the usual larger and more expensive sanders.

The streamlined design of the Skilsaw Zephyrplane represents more than merely modern styling—it results in a perfectly balanced tool that provides uniform pressure over the entire sanding surface. A novel feature is the interchangeable knob handle that can be moved from the top to the nose of the sander for greater convenience in sanding vertical surfaces. Another outstanding feature is the patented "touch-control" lever which instantly releases the tension on the sanding belt, so that changing belts becomes a very simple and quick operation.

An important safety feature is the pressure control trigger switch which

makes accidental starting impossible. This switch is mounted in a bakelite handle that not only is a non-conductor of electricity, but is also cool and com-

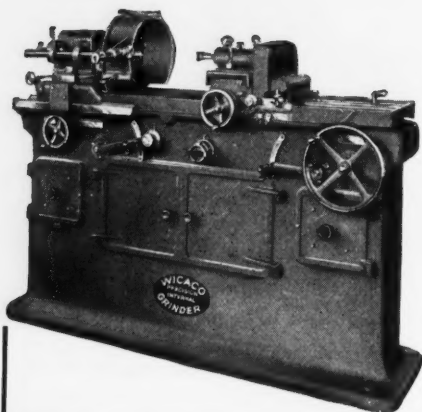
Skilsaw "Zephyrplane" Sander



fortable to hold while sanding. The mounting of the motor permits straight line ventilation that results in greater cooling efficiency. Smooth running is assured by ball bearings on the armature and transverse shaft. Oilite bear-

5 Precision Features of the

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1. Rigid work-head.
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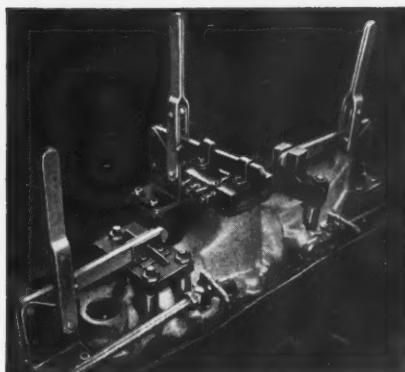
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ings are used on the idler and driver pulley. A belt speed of 1,200 surface ft. per minute permits fast sanding and is said to produce a smooth, even surface without ripples or ridges.

The compact construction of the Skill-saw Zephyrplane is due to its die-cast aluminum frame. The tool weighs only 13¼ pounds.

McCollum Low Headroom Electric Hoist

A low headroom electric hoist built integral with a steel plate trolley has been brought out by the McCollum Hoist & Mfg. Co., Downers Grove, Ill.



McCollum Low Headroom Electric Hoist

The illustration shows the load hook of the hoist at its highest point, the distance from the seat of the hook to the bottom of the I-beam being only 9 in. The trolley wheels are made of cast iron with turned threads and are equipped with two precision ball bearings each to assure easy and smooth travel.

The McCollum Hoist is provided with a heavy-duty drum type reversing switch having large contact points. The

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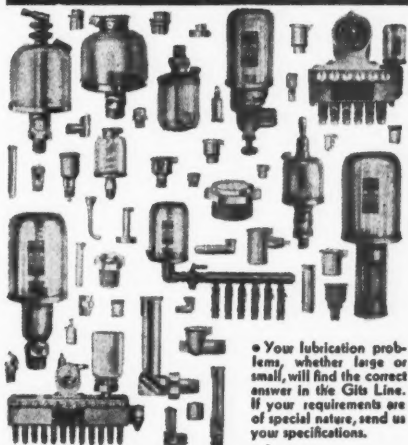
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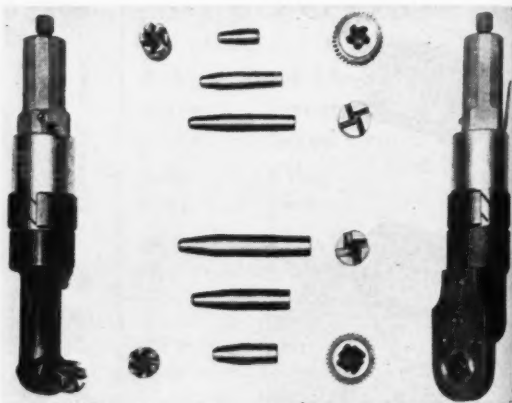
motor is available in practically any voltage, two or three phase, and also 110 and 220 volt, A.C. or D.C. The motor is said to be especially designed for hoist duty, having ample power to lift its rated load at the lifting speed listed with considerable reserve capacity. To reduce motor speed to load sheave speed, the hoist is provided with a straightline balanced drive gear assembly. All operating gears and shafts of the assembly are enclosed in an oil tight case with complete lubrication by grease being provided to all parts in the case except the two motor bearings. According to the manufacturer, the gear mechanism is highly efficient, giving maximum speed reduction with minimum power loss.

In addition, the McCollum Low Headroom Electric Hoist is equipped with an automatic limit stop which shuts off the current when the lift reaches its upper limit of travel. The hoist operates with the load on either or both ends of the chain and can be made to fit practically any size I or flat flange beam.

"Presto" Welding Electrode Dresser

An air-operated hand dresser, to be known as the "Presto," with which welding electrodes may be dressed without removal from spot welders has been introduced by the Progressive Welder Co., Detroit, Mich. The dresser is avail-

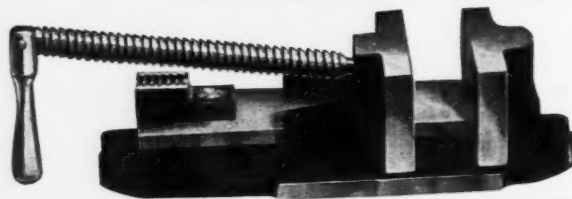
able in two types, the "flat plate" and "shank" type. The former is designed for use where space between electrodes is restricted, but, like the shank type, may be used for all other welding electrode applications.



Two Types of "Presto" Air-Operated Hand Dressers for Welding Electrodes

The Presto Dresser is designed to cut loss of time due to removal of welding points for reshaping, and to eliminate inaccuracies resulting from hand filing of mushroomed points. It is stated that the dresser is so simple to operate that it may be used directly by the welding operator with perfect results. The design permits the use of interchangeable blades, including dome-shaped, long and short taper-crowned points, to meet various electrode dressing requirements and point sizes. Cutters for special shaped electrodes are available on special order.

GREENE **SPEED VISE** SAVES TIME

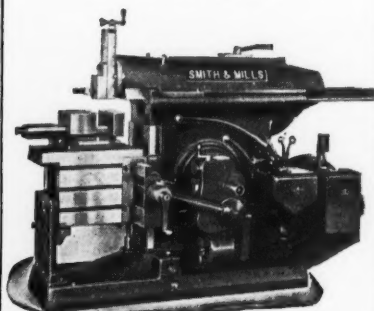


Instantly adjustable to any opening. Locks and unlocks with a half turn. 3", 4", 6" sizes.

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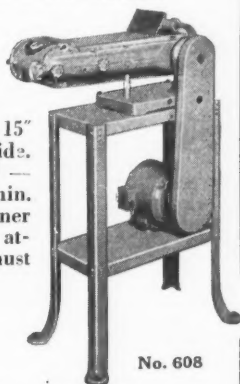
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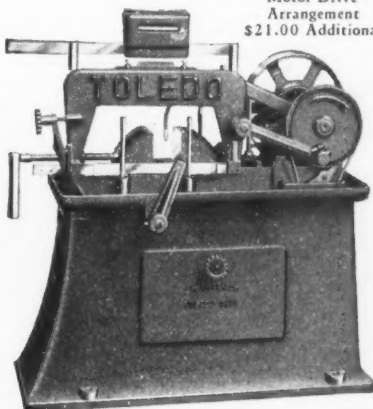
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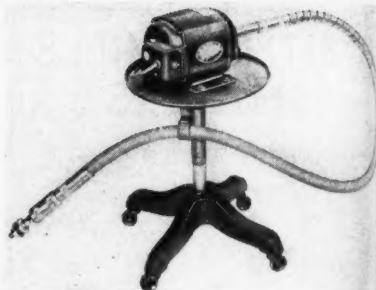
Motor Drive
Arrangement
\$21.00 Additional

In operation, the dressing of points is said to require only a few seconds. The cutter is merely held against the tip, a trigger on the dresser is pressed, and released as soon as the free running of the dresser notifies the operator that the point has been completely reshaped. It is said to be virtually impossible to remove an excessive amount of metal, and the dresser always restores correct radius.

The Presto Dresser is operated by attaching it directly to a regulation shop compressed air line. It is sturdy in construction, light in weight, and built for long service.

Stow "Junior" Flexible Shaft Tool

A line of flexible shaft tools for grinding, polishing, buffing, rubbing, wire brushing, sanding, filing, and drilling operations has been announced by the Stow Manufacturing Co., Inc., 1 Shear St., Binghamton, N. Y. The line, to be known as the Stow "Junior," has been designed as a companion line to the Stow heavy-duty tools. Various features of the new models have been



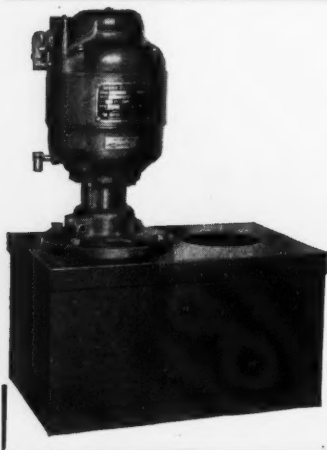
Stow Assembly GJ Pedestal Tool

patterned after the heavy-duty units for extra durability being the result.

First of the Stow Juniors to be put on the market is the pedestal type illustrated herewith. It incorporates a motor, extension cord and plug, flexible shaft, and clamp spindle. Connection can be made to any light socket. Mounted on a four-leg metal base with ball bearing casters, the unit is steady and can easily be pushed about. The pedestal is adjustable in height and maintains low center of gravity with

"GUSHER" Tank and Pump Units

For Machines without Reservoirs



These units supply coolant dependably and economically on machines not originally equipped with pumps or reservoirs. All that is needed is a distribution and return line to make the installation. Available for power circuit or light socket plug-in.

The pump shown is the Model UL, noted for its simplicity and efficiency . . . its elimination of all packing nuts, foot valves and relief valves. Requires no priming . . . not injured by grit or abrasives. Write for catalog.

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July, 19

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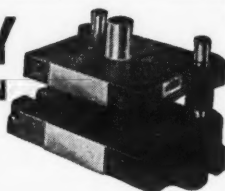


This machine quickly stamps details and serial numbers into name plates.

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BLACK DIAMOND Precision Drill Grinders give you the simplified, fast and accurate drill grinding that *quickly* pays the cost of the machine. It holds the drill in a fixed position while making a complete revolution. Lips are ground exactly the same length giving the proper angle and clearance to insure easy cutting. No. 1 grinds drills No. 60 to 1 1/32" without complicated adjustments.

Write for Bulletin No. 121

BLACK DIAMOND SAW & MACHINE WORKS, INC.

45 NORTH AVE • NATICK, MASS.

consequent good balance, even in extended position. It carries a convenient tool tray. Standard Stow attachments used on the heavy-duty models are supplied for the Stow Juniors.

Motors of $\frac{1}{4}$, $\frac{1}{2}$, or $\frac{3}{4}$ h.p. can be used with two choices of speeds—1,725 or 3,450 r.p.m. The $\frac{1}{4}$ h.p. tool has a $\frac{3}{8}$ -in. flexible shaft, 5 ft. long. Its maximum wheel capacity is 4 x 1 in. and maximum drilling capacity is $\frac{1}{4}$ in. The $\frac{1}{2}$ and $\frac{3}{4}$ h.p. tools have a $\frac{1}{2}$ -in. x 6-ft. shaft, a maximum wheel capacity of 6 x 1 in., and a maximum drilling capacity of $\frac{3}{8}$ inch.

Numberall Marking Stand No. 47

The illustration shows the Numberall Marking Stand No. 47 which has been designed by the Numberall Stamp & Tool Co., Huguenot Park, Staten Island, N. Y., to facilitate the markings of a large variety of parts and plates such as gears, bushings, name plates, and so on. The use of this device is said to ensure uniform impressions, accuracy, and rapidity in stamping. On small size letters and figures, the ham-

mer shown in the illustration is required.

The stand is of strong construction and can be operated by foot through



Numberall Marking Stand No. 47

the use of a treadle specially supplied. In addition to the use of the stand in stamping letters and figures on metal, wood, and so on, the marking device can also be used for light riveting, eyeletting, light punching, center punching, and hot branding wood and molded parts.

The following attachments can be used with the Numberall Marking Stand No. 47: Numbering heads, Numberall rotary stamps, type and holding marking dies, automatic spacer name plates, single letter or figure stamps, trade mark dies, and so on. Work-holding fixtures together with branding dies and numbering heads fitted with electric heaters can be supplied.

Gem No. 9 Drill Press Vise

The line of "Gem" Machine Vises made by the J. E. Martin Tool & Works, Springfield, Ohio, has been augmented by the addition of the No. 9 vise with two accessories. The accessories are a tilting base and a swivel base which can be used interchangeably for angle work. The tools have been designed for use on small, light presses, bench millers, and similar equipment. The vise has a capacity of 3 in., and the jaws are $2\frac{3}{4}$ in. wide.

VISE

With and Without Jig Attachments

For Drill Press
Often used on Miller, Shaper or Planer.

6", 9", 12" Jaws

Fig. 2
Without Jig Attachments

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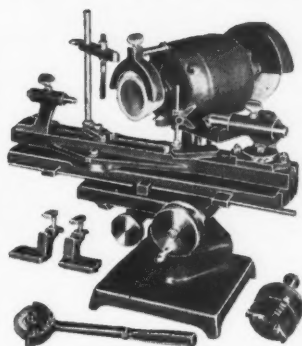
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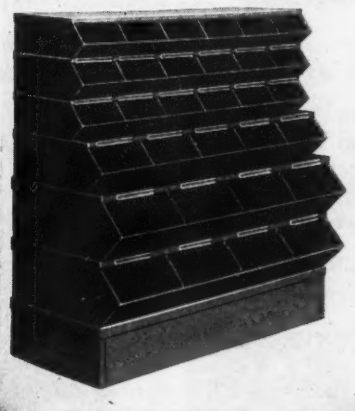
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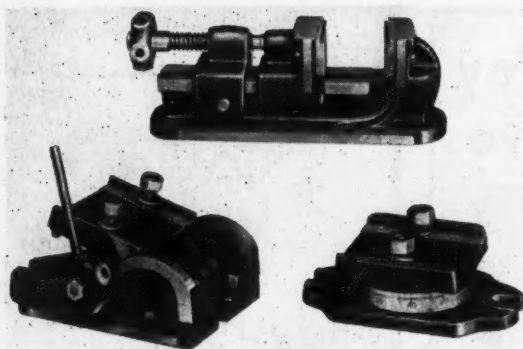
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Convenient stock facilities can save time—labor—money. Find out today how Stackbins can lower *your* handling costs. Write to Stackbin Corp., 53 Troy St., Providence, R. I.

STACKBINS
"STACKED AND STILL ACCESSIBLE"



Gem No. 9 Drill Press Vise

by $1\frac{1}{4}$ in. deep.

When pressure is applied to clamp the workpiece, the movement of the sliding jaw is forward and downward at the same time. In this manner work is held firmly parallel with the working surface of the vise, and all need of tamping down is eliminated.

The vise is the smallest model of the "Gem" line, weighing but 7 lbs. It is

applied, without strain which would tend to throw it out of line. Graduations are placed where they can be easily seen and are on a large diameter to make them clearly legible. It is graduated full 90 degrees, by degrees. The tilting base also has machined beads along the side for accurate lining up.

The swivel base is also a separate unit upon which the vise can be quick-

made of high grade machine tool iron—sometimes known as semisteel—and is heavily reinforced at points of strain. The jaws are of tool steel, hardened and ground, with horizontal and vertical V-grooves for holding around work. The jaws also have built-in parallel grooves at the top, which eliminates the use of loose parallels in many cases.

The tilting base is a separate unit to which the vise can be quickly mounted by merely running down and tightening two nuts. The clamping mechanism which holds the unit to the angle for which it is set, is so designed that great force is

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5 MODELS

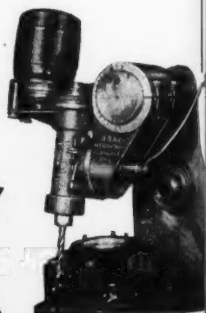
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City.

July, 1931

15. Production Surface Grinder

Bergram Surface Grinder Type SG-1 is featured in a new circular released by Bergram Mechanical Engineering Co., Inc., New Britain, Connecticut.

16. Rexalloy Tool Bits

An interesting booklet on Crucible Steel Company's new non-ferrous cutting alloy, now available in tool bit form. Examples of increased speeds and deeper cuts made possible with Rexalloy are shown. It's booklet TS400. Crucible Steel Company of America, 405 Lexington Ave., New York, New York.

17. Tool Steel Wall Chart

A new 20 x 30 tool steel wall chart designed to simplify tool steel selection is available from The Carpenter Steel Co., Reading, Pa.

18. Drill Chucks

Folder 100, released by Scully-Jones & Co., 1913 S. Rockwell St., Chicago, Ill., illustrates, describes and lists prices on "Feed as you need" Chucks.

19. Expansion Reamer

Staples Tool & Engineering Co., Cincinnati, Ohio, has issued a new folder which illustrates and describes the Staples Carboloy tipped expansion reamer.

20. Woodruff Type Keys and Cutters

Catalog V-111, issued by The Whitney Chain and Mfg. Co., Hartford, Conn., completely details Whitney Woodruff Type Keys and Cutters.

21. High Speed Grinders

Themac High Speed Portable Electric Precision Grinders are illustrated and described in a new circular released by The McGonegal Mfg. Co., East Rutherford, N. J.

22. Gear Tooth Checking

A new bulletin featuring the Fellows Involute Measuring Machine has been prepared by Fellows Gear Shaper Co., Springfield, Vermont.

23. Tool Steel Guide

Bethlehem Steel Co., Bethlehem, Pa., has issued a 36-page booklet outlining the entire range of tool steels and their fields of use, plus a systematic method for selecting the right steel for the purpose.

24. Tube Burring Cutters

Bulletin 12-T features Severance Tube Burring Cutters and other tools for scores of applications. Severance Tool Manufacturing Co., Saginaw, Michigan.

25. Ball Bearing Ideas

Ball Bearing Ideas by New Departure Engineers is the title of a helpful 20-page booklet just released by New Departure, Division General Motors Corp., Bristol, Connecticut.

Print plainly in filling out coupon for literature.

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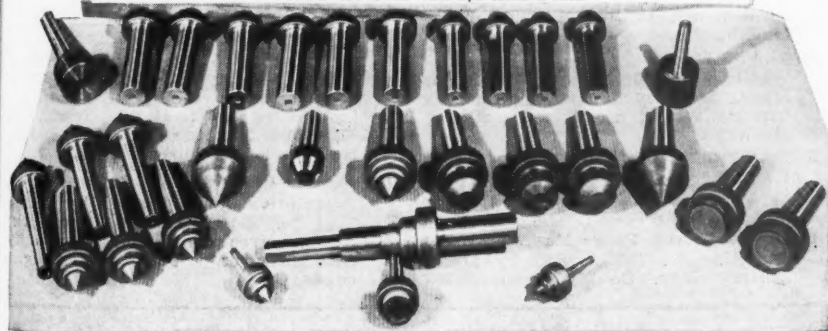
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*To obtain copies of the catalogs listed here,
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1. **Carbide Tipped Tools**
Catalog 142, issued by Wendt-Sonis Co., Hannibal, Mo., presents details and process on all types of W-S cemented carbide tipped cutting tools.
2. **Vertical Rotary Surface Grinder**
The Portman No. 12 Vertical Rotary Surface Grinder is illustrated and described in new bulletin released by Portman Machine Tool Co., Mount Vernon, N. Y.
3. **Punch Presses**
Bulletin available from Duro Mfg. Co., Los Angeles, Cal., features Duro punch presses, bench milling machines, and accessories.
4. **Thread Miller**
Waltham Machine Works, Waltham, Mass., has issued new bulletin featuring Waltham Thread Milling Machines.
5. **New Bulletin HD-142,**
featuring the Hevi-Duty Carburizer, is available from Hevi-Duty Electric Co., Milwaukee, Wis.
6. **Power Driven Forge Hammers**
Bulletin No. 1034 issued by D. J. Murray Mfg. Co., Wausau, Wis., presents details and specifications of Murray Improved Power Driven Forge Hammers.
7. **Lathe Turrets**
Folder details the three sizes of station lathe turrets manufactured by Automatic Machine & Tool Co., Auburndale, Mass.
8. **Scientific Metal Cleaning**
Four types of metal cleaners covering practically every metal cleaning operation are described in a bulletin which is now being issued by The DuBois Company, 1120 W. Front St., Cincinnati, Ohio.
9. **Heavy Duty Lathe**
An eight-page bulletin illustrating and describing the Simmons Heavy Duty Lathe, available in 48 and 64-inch sizes, is available from the Simmons Machine Tool Corp., 1745 N. Broadway, Albany, N. Y.
10. **Surface Plates**
Descriptive folder issued by Acme Tool Co., 200 Church St., New York, N. Y., gives details on Acme surface plates, angle plates and straight edges.

Print plainly in filling out coupon for literature.

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"Serving Industry" is the title of an attractive 36-page booklet which has been compiled by Sun Oil Company, Philadelphia, Pa., to supply industrial executives with vital information about petroleum products, their manufacture, uses, and advantages.

The booklet covers the important phases of petroleum products. It shows the striking of oil in Texas, loading and transportation by pipelines and tank-ship, refining the crude oil, and putting the finished products through their paces before they are shipped to industry. Then, in turn, it covers the lubrication of essential industrial equipment. Starting with main power equipment, it includes hauling equipment, metal working, mining equipment, miscellaneous industrial equipment, and miscellaneous petroleum products. Each piece of industrial equipment is amply illustrated with timely photographs, and the lubrication requirements and technical practices for each piece of equipment are presented in a clear, understandable manner.

A copy of the booklet will be sent without charge to any plant executive who will address a request on his company letterhead.

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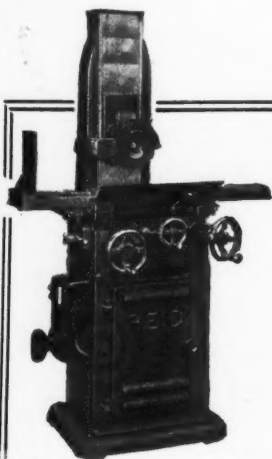


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- 1. Portable Electric Tools**
Skilsaw, Inc., 5037 Elston Ave., Chicago, Ill., has released Catalog No. 40. It is a 56-page catalog illustrating and describing the Skilsaw line of portable electric tools.
- 2. Cold Finished Steel Bars**
An attractive and useful folder has been published by LaSalle Steel Co., P. O. Box 6800 A, Chicago, Ill., which illustrates and outlines many uses of LaSalle Stressproof cold finished steel bars.
- 3. Di-Saw Advantages**
The Tannewitz Di-Saw for sawing, filing and polishing is detailed in a new bulletin issued by The Tannewitz Works, Grand Rapids, Mich.
- 4. Self-Lubricating Bearing Bronze**
Catalog L-1, issued by Johnson Bronze Co., New Castle, Pa., gives facts about Johnson Ledaloyl and complete size and price information are included together with complete installation data.
- 5. Tangent Dies**
J&L Tangent Dies and Chasers are illustrated, described and cataloged in a 16-page circular released by Jones and Lamson Machine Co., Springfield, Vermont.
- 6. Tool Room Grinder**
Abrasive Machine Tool Co., East Providence, R. I., has just issued an attractive bulletin featuring the Abrasive No. 3B Precision Surface Grinding Machine.
- 7. Bench Lathe**
The Rivett 505 Bench Lathe Series is featured in a new 24-page circular released by Rivett Lathe & Grinder Inc., Brighton, Boston, Mass.
- 8. Roller Chain Catalog**
The Baldwin-Duckworth Chain Corp., Springfield, Mass., has just issued Catalog M, which lists and describes the company's complete line of single and multiple strand roller chains, sprockets and specialties. Other items are also featured.
- 9. Facts About Grinding Wheels**
This 76-page book will be of vital interest to all who purchase and use grinding wheels. Norton, Co., Worcester, Massachusetts.
- 10. Coated Abrasive Papers and Cloths**
A useful catalog and price list chock full of useful information on coated abrasive papers and cloths has just been issued by Abrasive Products, Inc., South Braintree, Mass.
- 11. New Sine Angle Plate**
The New Kar Sine Angle Plate which incorporates improvements over earlier models, is detailed in a new bulletin. The Kar Engineering Co., Inc., 200 Hudson St., New York, New York.
- 12. Flexible Couplings**
Considerable useful information is contained in new Bulletin 57 featuring Morse Flexible Couplings. Morse Chain Co., Ithaca, New York.
- 13. Shim Application Chart**
This new chart, just released, contains a comprehensive survey of proved applications for laminated shims and shim stock. Laminated Shim Company, Inc., 21-86 Forty-fourth Ave., Long Island City, New York, N. Y.
- 14. Steel Bending Brakes**
Dries & Krump Mfg. Co., 74th St. and Loomis Blvd., has issued a handy catalog featuring the line of Chicago Steel Bending Brakes.